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IN THIS ISSUE —

A Strategy for Introducing New Plant Materials to the Arboretum

Since the early 1970's the Arboretum's number of plant introductions has declined to approximately 400 accessions per year, about one third of the postwar norm. This deterioration is due partly to the Arboretum's uncertain future, partly to the reduction in funding and partly to the need for better sources of suitable plant material.

Hopefully the first of these problems will be resolved in the coming year. But the second and third might best be approached on a semi-private basis as was the case during the early years of the Arboretum's development. A modern program such as Dr. Hatheway outlines might now be sponsored by interested horticulturists.

A few years ago the Study Club of the American Rhododendron Society's Seattle Chapter sponsored by private donation a botanical exploration of Sikkim. The collected seed was divided among the donors, and Seattle's gardens will be the richer for many years to come.

Would it not benefit both the Arboretum and its supporters if a similar program were launched with the intention of enriching the Arboretum's collections as well as those of private gardens? Surely a formula for sharing the seeds or seedlings could be worked out to everyone's satisfaction.

The Arboretum would like to be able to grow not only Drimys winteri, *which was used as an example in Dr. Hatheway's article, but also many other attractive plants from warmer climates which offer the possibility of developing hardy strains.*

There are many gardeners among our readers who have the same predilections. Surely from among you can come the impetus for such a venture. *THE EDITOR*

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COVER
Eucalyptus perriniana
blooming in the garden of Brian and Margaret Mulligan,
July 1977 (see article p. 17).

Photo: Brian O. Mulligan.

A Strategy for Introducing New Plant Materials to the Arboretum

*WILLIAM H. HATHEWAY**

Seattle gardeners are fortunate to live in a climate in which they can grow an unusually large number of kinds of plants. The University of Washington Arboretum contains specimens of woody plants native over a range of latitudes which includes Canada, Alaska, Siberia and northern Europe on one extreme to northern Florida, central Mexico, Formosa and southwest China and northern Burma on the other. Many of our choice rock garden plants are natives of New Zealand, Tasmania, Australia and southern Chile.

Despite these riches, Seattle gardeners are not completely satisfied with their lot. Many are frustrated not to be able to grow some of the fascinating desert plants native in eastern Washington, Oregon and California. Others are interested in a number of species that are somewhat tender in Seattle, but which are not particularly difficult for gardeners in coastal southern Oregon or California. The latter group contains members of genera already familiar to Seattle gardeners: *Rhododendron, Gaultheria, Pieris, Nothofagus, Camellia, Hydrangea.* Others may be somewhat less generally known: for example, *Gunnera, Taiwania, Eucryphia, Drimys.* These plants, which are adapted to relatively mild, often maritime climates, undoubtedly present promising opportunities for introductions. In what follows we will be concerned with developing strategies for increasing the likelihood of successful introductions of warm temperate or tropical mountain plants to the Seattle region.

Variation and Adaptation in Wild and Cultivated Plants

Plant breeders working with basic food crops such as wheat, rice, corn and potatoes have been aware for some time that man has grown economic plants for nearly 10,000 years over very wide ranges of environments. For example, there is a great deal of evidence that the Indians of North and South America cultivated maize from the Gaspé Peninsula, near the mouth of the St. Lawrence River, to Argentina and from sea level to nearly 4000 meters elevation near Lake Titicaca, in Bolivia.

These strains of maize vary greatly in many characteristics: size and shape of ear and kernels, number and density of tassel branches, plant height, hairiness of stems, drought tolerance and age at maturity. Moreover, varieties which are well adapted in Johnston, Iowa produce sickly yellow plants with no ears in Bogotá, Colombia. Colombian plants grown in Iowa, on the other hand, are almost treelike: tall, thick-stemmed and with lush dark green foiliage, but they produce little grain.

Similarly, there is a great deal of variability in wild species of plants which grow over vast geographical ranges. Douglas fir is a familiar example to Northwest gardeners. Most are aware that there are two more or less distinct forms: the huge trees of the Pacific slopes and lowlands, from British Columbia to northern California; and the rocky Mountain type, usually somewhat smaller and with bluish-green foiliage, which occurs from eastern British Columbia and Alberta to Arizona and New Mexico, with outliers at high elevations in the Mexican states of Chihuahua, Sonora and Hidalgo. It seems obvious, probably, that one should not expect seed of Rocky Mountain Douglas fir collected in New Mexico to produce trees that are well adapted to the climates of Seattle and Vancouver, British Columbia. It

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*Dr. Hatheway is Professor of Forest Resources at the University of Washington and an active member of the Arboretum's administration. He has previously co-authored two articles for the *Bulletin* relating to the Frost Hardiness Research Program (Vol. 38, No. 4, 1975; Vol. 40, No. 1, 1977). In this article he shares with us his many years' experience working as a botanist in the American tropics and his interest in developing the Pacific Northwest's potential for growing ornamental plants.

is the experience of foresters and corn breeders that the best adapted plants are usually those of local stock, for they have been rigorously selected by man or nature over thousands of generations in competition with other plants of the same and different species. Only the fittest have survived.

Turning to potential introductions, it may be instructive to consider the case of *Drimys winteri,* an attractive small broad-leaved evergreen tree with clusters of waxy-white flowers, which is marginally hardy in the Arboretum. One would hardly expect seed of *D. winteri* collected in the mountains near Santiago, Chile to be particularly successful in Seattle, for Santiago has a climate rather like that of Santa Barbara, California. But *D. winteri* grows as a wild species from the Straits of Magellan in southern Chile northward along the Andes to Colombia and in the mountains of Central America from Panama and Costa Rica to the Mexican states of Oaxaca and Vera Cruz. Like maize and Douglas fir, *D. winteri* is highly variable. Accordingly, one might hope to find forms that are fairly well adapted to our Seattle climate somewhere between Santiago and Punta Arenas, in Tierra del Fuego, some 1300 miles away.

Tropical Mountain Plants

The *Drimys winteri* trees I have seen in the mountains of Costa Rica are particularly attractive. They are relatively small and upright with short stiff branches and small to medium-sized leathery dark green, shining evergreen leaves. The clusters of fragrant white flowers occur among the newer foliage. These trees grow in high elevation forests in company with native species of oaks, cherries, dogwoods, alders, elms, mulberries, magnolias, hollies, blueberries, *Fuchsia, Styrax, Symplocos, Ardisia,* and other perhaps less familiar woody plants that also occur in warm to cool temperate forests in many parts of the world. For example, very similar forests occur in the Andes and in the mountains of the Philippines, Borneo and elsewhere in the Old World tropics. *Drimys winteri* is most abundant at the edges of these beautiful mid- to high-elevation forests. Although it invades pastures, it is used by Costa Rican farmers for living fence posts, which are of course, most attractive along country roads in the mountains. Because of its elegant growth form, Costa Rican *Drimys winteri* would be an exceedingly valuable addition to Seattle gardens.

What are the prospects for successful introduction of Costa Rican or Colombian forms of *Drimys winteri?* We must say at the outset that they are probably not very good, but that nevertheless these plants may be of value as sources of breeding material for improving Chilean *D. winteri* (if this seems desirable). On the whole we have not been very successful in our attempts to grow tropical mountain trees in Seattle. For example, Professor Stanley Gessel, of the Col-

***Drimys winteri,* blooming in May (see page 5 for plant habit). Photo: Brian O. Mulligan.**

lege of Forest Resources, has made numerous attempts to introduce the Costa Rican form of *Alnus jorullensis.* This evergreen alder, which is obviously very closely related to our *A. rubra,* also occurs at the edges of oak forests in Costa Rica, often in competition with *D. winteri* but usually at somewhat lower elevations. In Seattle, it grows rapidly from seed, but has always been winter-killed, even when planted in protected beds at the College of Forest Resources, where supposedly tender species of *Eucalyptus* have grown to considerable size. On the other hand, a form of *Cornus florida* native in the mountains of northeastern Mexico has proved to be exceptionally hardy in the Arboretum and in frost tolerance tests in Professor Hubertus Kohn's laboratory (Hatheway et al., 1977).

It is interesting to note that species of *Gaultheria* and *Pernettya* collected in the so-called "páramos" of Costa Rica have been grown for about ten years in Seattle gardens. These páramos are a vegetation of low to medium-sized shrubs, many of them ericaceous, like the small tree *Vaccinium consanguineum,* which occur just above tree line. The true páramos of the northern Andes which are found above a similar belt of scrub vegetation, are essentially an alpine meadow vegetation of grasses and sedges in which grow rather bizarre giant rosette plants in the genera *Espeletia* (Compositae), *Puya* (Bromeliaceae) and *Lupinus* (Leguminosae).

Pernettya coriacea is a very common shrub in the Costa Rican páramos, usually three to five feet tall and with small, tough, sharp-pointed leaves like those of the Chilean *P. mucronata* but differing from that species in its growth habit, which is that of a miniature tree, usually not branched from the base. In Mrs. Rodney B. Allen's garden in Seattle *P. coriacea* comes through most winters essentially undamaged. Her Costa Rican *Gaultheria* (which I have tentatively identified as *G. donnellii*), on the other hand, is usually killed back to the ground every winter. If the root system is well established, it recovers quickly in the spring, sending up a new crop of shoots which usually produce flowers and fruit. I have had no trouble growing a division of Mrs. Allen's plant in the Arboretum lathhouse. In that environment it does not drop its leaves. It regularly produces flowers and, like most *Gaultherias,* spreads by underground stems.

What can we conclude from these observations? It appears that some tropical mountain plants can be grown in Seattle gardens provided: (1) that they become well established, especially by developing vigorous root systems, and (2) that they have a certain level of frost tolerance. In Costa Rican plants, tolerance of Seattle winters seems to be correlated with natural occurrence at or somewhat above "timber line" (that is to say, in the subalpine scrub vegetation that becomes dominant at high elevations as trees drop out). There are many attractive plants in this vegetation: several species of orchids, many striking ferns (especially species of *Jamesonia* and *Elaphoglossum*), and species of *Escallonia, Vaccinium, Myrtus, Arctostaphylos* and *Arcytophyllum* (Rubiaceae), as well as interesting herbs in general such as *Acaena, Alchemilla, Lupinus, Viola, Geranium, Gentiana, Senecio* and *Hypericum.* Some of the most beautiful plants are shrubby hummingbird-pollinated shrubs in the lobelia and heath families. Among the latter special mention should be made of members of the tribe Thibaudiae of the family Ericaceae, stunning epiphytic plants related to *Vaccinium,* with hanging clusters of fleshy tubular white-tipped crimson flowers and large, thick leaves with elongated tips and three nearly parallel longitudinal veins.

Strategies for Introduction

Breeders of basic food plants such as maize, wheat, rice and potatoes have shared their collections for years. For example, some of the best wheat varieties developed for Mexico and Pakistan in the past twenty years contain germ plasm of dwarf plants obtained from Washington State University in Pullman. The Washington State dwarf stock was in turn derived from a dwarf mutant form first noticed by a Japanese wheat breeder. Modern plant breeding has a distinctly international flavor. Cooperative variety trials are carried out simultaneously in several countries and the results compared. Plant breeders around the world contribute to and draw on the resources of international seed banks they have set up, and they learned ways of using this vast stock of material effectively in their improvement programs.

It is clear that arboreta throughout the world also work in close cooperation with one another. Formal seed exchange programs (Witt, 1978) have existed for many years, and lists of available material are distributed widely every year. It is

also true that new collections of wild seed are continuously received by the University of Washington Arboretum and other botanical gardens and arboreta. Some of these collections are made on a strictly informal, *ad hoc* basis. A botanist traveling in Arizona or Costa Rica sees a striking plant and takes time from his busy schedule to collect and dry seeds and see to it that they reach Seattle. Seattle gardeners maintain contacts with friends in Britain, exchange material and make it available to others, often by donating it to the Arboretum for testing and propagation.

Perhaps the chief difference between the techniques of workers in crop plant breeding and ornamental horticulture is that the workers in the latter field tend more to depend on the efforts of dedicated volunteers. Clearly this is largely because of the great urgency of crop improvement programs in an increasingly hungry world. But more highly organized activity in introduction and testing of ornamental plants would certainly pay large dividends. Among areas which should receive special emphasis are collection, propagation, testing for adaptation and breeding.

Collection. Many of our collections of ornamental plants, especially those from the southern hemisphere and the tropical mountains, represent very restricted samples of what is available in nature. Much more systematic collecting of *Drimys winteri,* for example, would almost certainly produce forms that are better adapted to our climate, more attractive, or both. It is my impression that relatively less effort is being made in this direction than was the case early in the twentieth century, when Forrest, Kingdon-Ward and Rock made their famous collections in western China, Burma and the Himalayas. To be sure, there has been some increased activity recently at the Carey and other large arboreta in the eastern United States where expeditions to the Caucasus are being mounted. Cooperative efforts of this sort among arboreta on our west coast, western Europe, Japan, Chile, Australia, and New Zealand should be encouraged.

Propagation. Once seed is introduced, it must be germinated and the resulting plants must be grown and increased by vegetative or seed propagation or both. Much of this work will continue to be carried out in the greenhouses, lathhouses, and nurseries of institutions like the University of Washington Arboretum. But some consideration might be given to the establishment of a few seed-receiving centers where this work could be done particularly efficiently and inexpensively. For example, one might propose Hawaii as a center for receiving and increasing Malesian Rhododendrons, since much of the work that requires heated greenhouses in Seattle can be done out of doors or in lathhouses in Honolulu or Hilo. Similarly, a center for tropical mountain ornamentals could be established either in Hawaii or in a Latin American country such as Costa Rica or Colombia. A Latin American collection depot would be especially convenient for botanists working at the Smithsonian Institution, the Field Museum, the New York Botanical Garden and similar large museums in the eastern United States. These institutions often have one or more professional worker collecting dried plant specimens in the American tropics on roughly a regular basis. Some of these botanists could be persuaded to obtain cuttings or seed if this work did not greatly interfere with their regular work. A station in the Andes or Costa Rica would be attractive to them, because it would allow them to observe and compare and even to carry out experiments on living plant material.

Testing. Like the agronomist, the ornamental horticulturist requires information on the performance of new materials. He needs to know its rates of growth and development when exposed

***Drimys winteri* var. *latifolia* at Westonbirt Arboretum, Tetbury, Gloucestershire, in southern England.**

Photo: Brian O. Mulligan

to a number of environmental conditions such as full sunlight or shade, moisture and drainage, soil fertility and the like. In the case of perennial plants frost tolerance is crucial. A continuing program of hardiness testing is obviously essential to any enlarged program of plant introduction. This work is best carried out in well-equipped laboratories but experimental work must, of course, be supplemented by observation in the nursery and garden.

Breeding. Plant breeders who work with annual crops devote a substantial proportion of their efforts to hybridization and variety trials. Many standard experiments have been devised to compare with considerable precision large numbers of varieties in single experiments. These trials serve not only to identify promising new forms but also to discard relatively poor material. The experienced plant breeder relies on his eyes as well as the numerical data that come out of his plots. Plants are scored for resistance to disease and insects, general vigor, uniformity and other characteristics of agronomic interest. In ornamental horticulture much emphasis has been placed on size, shape, color and number of flowers, often in crosses between species. If increasing emphasis is placed on augmenting the number of collections of certain species such as *Drimys winteri,* improvement by hybridization within the species becomes possible. Certainly there is no reason why a frost-tolerant *D. winteri* with desirable growth and flowering characteristics could not be developed for Seattle gardens.

It is probably not necessary to emphasize that the kind of work proposed here merely represents an extension to ornamental horticulture of work now carried out routinely by crop and tree breeders. For example, a program very similar to the proposed one (but on a vastly greater scale) has been in effect at the Weyerhaeuser Research Center in Centralia, Washington. Nor should the program be restricted to Douglas fir or *Drimys winteri*. Except for true rarities, wild plant species generally consist of thousands or millions of individuals growing over relatively wide ranges of environmental conditions and exhibiting considerable variation in many characteristics of value to ornamental horticulturists. Exploiting this variability within species should be the central theme around which a modern program of plant introduction is developed.

I am grateful to Joseph A. Witt for helpful comments.

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Hatheway, W.H., H. Kohn and J.A. Witt. 1977. The Frost Hardiness Research Program. *Arboretum Bulletin* 40(1):2-8.

Witt, J.A. 1978. The International Seed Exchange. *Arboretum Bulletin* 41(2):32-33.

Note by the President: The foregoing article by Dr. Hatheway is certainly thought-provoking. It would appear that his proposal to introduce new plant items to the Seattle area through volunteer gardeners is feasible, and Foundation members could be those gardeners. I endorse the concept.

The Oak Lawn. All photos in this article are by Roger del Moral.

The Royal Botanic Gardens and National Herbarium, Melbourne

*ROGER DEL MORAL**

The Superintendent of Port Phillip Colony wandered the marshy banks of the River Yarra. The widely travelled Charles J. Latrobe lived for such rare interludes when he could escape the frustrations of his executive duties to roam the bush. However, that day's rambling was purposeful for he was to select a new site for a botanic garden. Previously proposed sites had each succumbed to the development and land speculation that followed the Victorian gold rush.

Latrobe, an amateur botanist and geologist, made a shrewd, well-considered decision. The Royal Botanic Gardens that grew on the site he chose are today a landmark whose carefully designed grounds are a pleasure to visit. The first Director, John Arthur, was trained in the English landscape tradition of Capability Brown. With Latrobe's support, he began to develop the site to produce a "pleasure garden" familiar to Victorian gentry.

When Victoria separated from New South Wales in 1852, Latrobe named Ferdinand von Mueller as Government Botanist. Von Mueller dedicated himself to the collection of the largely unknown Australian flora. In time, he received a barony and knighthood and remains the most distinguished Australian botanist; it was he who introduced *Eucalyptus* and other unique Australian taxa to horticulturalists throughout the world. When the Botanic Gardens Directorship became

*In this article, Roger del Moral, Associate Professor in the University of Washington's Department of Botany, acquaints us with another botanic garden in Australia, where he spent a sabbatical year in 1976-77. He previously described the gardens at Canberra (*Arboretum Bulletin,* Vol. 40, No. 2, 1977).

One of the ornamental lakes. Water plays an important role in the Gardens' design.

vacant in 1857, it was natural for von Mueller to assume the post. He transformed the Gardens into a scientific and representative collection of interesting species. In 1860, he established the National Herbarium of Victoria to house his large personal collection. Today, the National Herbarium contains over two million specimens and is the leading Southern Hemisphere herbarium.

Melbourne's social elite found it difficult to appreciate the somewhat eccentric, bush-loving Dr. von Mueller. Since this "aristocracy" demanded a return to the ideals of Arthur, von Mueller relinquished the Directorship in 1873; no other botanist held the post until 1971.

W.R. Guilfoyle was Director from 1873 to 1909, during which time the Gardens developed their current character. The style of the Gardens was little changed until 1971, when Dr. David M. Churchill assumed the Directorship. Since then, the general collection and glass house collection have been improved, and the Australian flora is becoming better represented.

Unlike the Canberra Botanic Gardens the Royal Botanic Gardens, Melbourne, consist largely of interesting or unusual species regardless of geographic origin. The 90-acre site includes thematic areas (for example, a rock garden and a fern gully) and sections devoted to plants of various Australian regions. However, the expansive lawns are the most distinctive feature of the Gardens. These offer ample picnic space and wide vistas. Three small lakes provide humidity to freshen the often oppressive summer heat and to provide habitat for an attractive collection of aquatic plants.

The ambience of the Gardens is that of a recreational park, an ideal place to spend a lazy Sunday afternoon. The modern Tea Kiosk provides light meals and drinks to reinforce the recreational aspects of the gardens. Transistor radios, tuned to cricket or "Australian rules" football, are common, but excessive volume or other disturbances are apparently unacceptable to the patrons.

Despite the city park atmosphere, the plant collection is valuable, containing over 10,000 specimens. Therefore, the grounds are fenced and open only from 7 a.m. to dusk. A mounted unit of Victoria Police patrols the grounds.

However, the Gardens attempt to maintain good public relations. For example water shortages and use restrictions occur periodically in Victoria. At such times, the Gardens now use reclaimed water from the River Yarra. Thus the Gardens remain verdant, but none can complain that he must suffer a brown lawn at home for the sake of the Gardens.

The National Herbarium contains over 2000 type specimens collected by von Mueller and much of the collections made by Banks and Solander in 1770 on Cook's first voyage to Australia. Others of the early Australian explorers contributed their collections to the Herbarium. Today, the seven-member staff engages in monographic studies of Australian taxa, such as *Grevillea*. The Herbarium publishes *Muelleriana,* an annual journal devoted to Australia systematics.

Because the Herbarium is state funded, it must respond to public needs. Its main public contact

The Tennyson Lawn. Spacious lawns, shade and exotic plants contribute to the pleasure of a visit.

is through a plant identification service, which makes 12,000 annual determinations for government agencies, doctors, veterinarians and the general public. The Herbarium sponsors public lectures and engages in the usual mutual exchanges of specimens and seeds with other institutions. However, neither the Herbarium nor the Gardens has a public education program.

The Herbarium supports two research programs that demonstrate an innovative response to modern needs. Dr. Churchill directs a biogeographic survey of Victoria. The goal, now largely realized, is to produce distribution maps for each species known to occur in Victoria. The system is computerized to permit rapid data retrieval, update distribution records, and to improve the resolution. The data provide a baseline against which to judge floristic changes (especially weeds) and information for environmental reports.

A second project, directed by Dr. Paul Gullen, is to produce a detailed floristic map of Victoria, using field inventory, serial photography and computer-assisted analyses. The goal is a fine-grained map for use by land management authorities. In both programs, the National Herbarium supports efforts to generate data required for informed decision making.

The "pleasure gardens" that comprise the Royal Botanic Gardens keep pace with modern needs and attitudes. Public relations efforts, such as public planting ceremonies by visiting dignitaries (for example, Queen Elizabeth II), and close liaison with special interest garden clubs, keep the Gardens in public view and encourage considerable public support. Their scientific merits remain undiminished by being primarily a park for people. The Gardens remain botanically interesting and retain popular support that encourages continued adequate funding. The more scientifically valuable work is carried out in the less glamorous confines of the Herbarium.

The synergistic interaction between these institutions and the public and concern for public welfare and amenities are distinctive features of the Royal Botanic Gardens, Melbourne.

ACKNOWLEDGEMENT

I thank Dr. David M. Churchill, Dr. Peter Lumley, and Dr. Paul Gullen for their cooperation prior to the preparation of this report.

Another view of the water.

***Encephalartos altensteinii*, a cycad from South Africa.**

The Reforestation of Seattle: Part Two
Seattle's Leafy Crown

*MARVIN BLACK**
Seattle City Arborist

Those who left Seattle in the exodus of the late 1960's will be those most surprised to see the Seattle of 1990. They'll find the 20,000 street trees planted since that time maturing to a leafy crown that I predict will have greater impact than all the tall buildings now going up downtown. Changing the center-city skyline so that we realize ours is really a CITY is exciting, but there are other ways to change skylines on a lineal rather than a vertical scale.

Garrett Eckbo, a famous landscape architect, stated: "Trees, rather than buildings are the best measure of civilized landscape. A community in which many mature trees survive and more are planted regularly demonstrates a sense of time, history and continuity on the land. It takes ten years or longer to produce a reasonably mature tree in most parts of the country; few urban land users anticipate tenure longer than five years. This is not progress, growth, development or vitality. It is insanity — a squirrel cage in which most of us chase madly round and round only to find the same old ugly city in the end."

I receive gratifying letters from people who have visited Seattle. They write back to say how impressed they were by the trees on our streets. Once we can drive or walk for miles on tree-shaded arterials, Seattle will have completed a giant step in urban reforestation. Those logged trees of early day Seattle made a vital, dynamic contribution in their day, even if in nostalgia we miss them. This new wave of green trees will make as great a contribution, giving our city a richer, more human appearance.

Sometimes a city plants thousand of trees, then leaves them on their own to survive without care. Dismayed citizens watch their bright hopes die with the trees. Seattle is avoiding this. We planted larger trees than many cities, and we stake them differently. These two simple techniques have reduced our annual loss rate from all causes to about five per cent, compared with many cities' losses as high as twenty-five per cent yearly. We expect an average 80-year life for these young trees, and some will live several hundred years. Our maintenance is based on that long-range view. Even pruning of the young trees aims at the ultimate tree structure; for instance, we make sure that major young scaffold branches aren't left aimed directly at street lights, saving both money and proper tree shape later.

In crowded spaces we choose smaller or narrower trees that won't become impossibly large and cause requests for their removal in a few years. Yet we use large tree varieties where large-scale buildings or features are involved, if there is adequate root space to allow the trees to grow to the desired size. In eastern cities I was appalled to see large trees dying where they had been shoehorned into spaces unable to support them. They looked good for a few years, but had failed to do the grand job that was intended, and the resulting large stumps in the small holes frightened away planters of replacement trees.

I expect the next surge in Seattle street tree planting to come less from the public sector than from the private one. San Francisco, reaping leafy harvests from 40 years' pro-tree educational campaigning by numerous supporting organizations and companies, boasts that in older portions of the city, including downtown, fifty per

*Marvin Black has written this follow-up of his article "The Reforestation of Seattle," which appeared in the spring issue of the *Arboretum Bulletin* (Vol. 41, No. 1, 1978). It is intended to give specific information regarding Seattle's street tree program and the trees that are being used. He hopes that some day a demonstration planting of successful trees can be established and a brochure made available to inform interested gardeners about these trees and where they may be seen in Seattle.

cent of all street trees are planted by the private sector. These individuals, groups, businessmen are equaling publicly funded efforts, and the private sector is economically conscious enough of the aesthetic and environmental value of the trees to pick up its share of the sizable maintenance cost as well. Such involvement explains San Francisco's incredibly low one per cent yearly street tree loss.

Business groups in downtown Seattle, Capitol Hill, Magnolia, the University District and Madison Park have produced tree plantings or funding for them in their areas. They agree with studies which show that business areas with leafy canopies overhead, even with some of the problems that trees bring, will draw more shoppers and more sales. Forward Thrust trees will do the same for at least six other Seattle neighborhood business areas.

Ten years from now Fifth Avenue will probably be our most pleasant downtown street. Trees and plantings will be a major reason. From Roy Street to the north, that green parade of London plane trees (bless 'em/curse 'em!) will march downtown, straddling the Monorail, a whole mile to Virginia Street, and this will be the favored stroller's route to Seattle Center. A few years hence strolling will be "in" again! Then, walking south from Stewart Street, there'll be a maple canopy extending to Yesler Way (right now it stops at Spring).

The 1978 broader walks and amenities coming with them will contribute, but there's more. Seattle is discovering planted plazas, people-places like those popular in Europe that humanize the heart of the city. The jewel called Freeway Park is a giant green downtown plaza, Pioneer Square and Occidental Park are others, Westlake Mall may become one. Plazas offer more than places to rest feet, they offer contemplation of people like one can find in Pike Place Market, a chance to study architecture around the plazas, hear a fountain, be tempted by flanking shops and restaurants, enjoy the city and its crowds as drama rather than opponents.

For me the excitement is greater because commercial interests are joining in; Seattle's earliest skyscraper plazas were barely planted, but watch the new ones as they come! To get the idea of what plazas can do, stroll sometime beginning at the foot of San Francisco's Market Street, uptown a mile to City Hall. Nearly every tall building has a plaza for people at its base: flowers, trees, lawns, benches, fountains and statuary, a photographer's paradise!

A new planting of maples on Fifth Avenue. Photo: G. Pirzio-Biroli.

Take a trip with me: 1990. We're starting a Fifth Avenue excursion at Stewart Street, walking south under the maples. Here on our right is a new park with relaxing shoppers, and pigeons and people-watchers, where the old monorail terminal used to be. A block beyond is People's Bank's mid-block green garden, and in the next block, plazas bright with color cluster around the Rainier Tower pedestal. Farther on, the sunken plaza by the IBM Building tempts us with its fountain, and we catch a glimpse (no, let's make it a detour!) of Freeway Park offering its lawns and city-canyon waterfalls. Turning back west on Spring Street, we enjoy the Park Place Building's plazas which extend Freeway Park, we note George Tsutakawa's Naramore Fountain across the street, and then we continue south again on Fifth Avenue, beyond the upper plazas at the Public Library and the formal Federal Courthouse lawns. Southeast of the Courthouse, in our imaginary 1990 stroll we observe a cluster of planners

Photo: G. Pirzio-Biroli.

Flame ash *(Fraxinus oxycarpa)* on 35th Avenue NE.

studying prospects for a new park to cover the freeway from Madison down to Jefferson Streets — they want to tie it to an east-west mall of new public buildings extending uphill from the existing ones. Completing our stroll on Fifth Avenue, we pass the Bank of California plaza, the Methodist Church lawns, and the plantings east of Fifth Avenue in the plaza of a tower that was built in 1980. Another new building, with lawns, is going in between Columbia and Cherry Streets, and then there are the plazas of the Municipal Building and the King County Administration Building. Finally, we cross to take the path up through the planting just north of Yesler Way, resting at one of the benches there before we climb up the hill to Sixth and Yesler and walk down the hill through Kobe Terrace Park into the International District with its new street tree plantings. See how the dream works? And most of it is either already installed or planned.

Which of our 20,000 street trees do we like best? Where can you see them? Here goes.

More people call to ask "What's the name of the tree on 35th Avenue Northeast?" than about any other. It is the Flame ash (*Fraxinus oxycarpa* 'Flame'), named for its fall color, which in Seattle is more nearly purple than red. A symmetrical egg-shaped tree with lacy-looking foliage, it grows about 35 feet high, and the three-mile planting on 35th goes from Lake City Way south to Wedgewood, with younger plantings on Broadway, on Capitol Hill and in Wallingford on N 45th Street.

A faster-growing, rangier ash with yellow fall color is *Fraxinus pennsylvanica* 'Marshall Seedless,' planted through Lake City on N 125th Street, east of White Center on S Roxbury, south from Yesler Way on 20th Avenue S, and as the tree in the new median planting at the east end of the NE 45th Street viaduct.

Seattle is naturally maple country, even though the native *Acer macrophyllum* is too muscular for sidewalk planting. We've planted forms of *A. rubrum* (red maple) extensively. One of these, 'Red Sunset,' probably the fastest-selling new United States tree, will flash its brilliant hot fall color in Fremont, Madrona and South Park plantings each year now. Similar in color but narrower is *A. r.* 'Armstrong,' planted on 15th Avenue S on Beacon Hill and on Madison Street on First Hill. A

Close-up of the flame ash showing careful pruning to assure proper shape in maturity. The broken stubs will be cared for the next time around. Photo: G. Pirzio-Biroli.

superior selection of Norway maple, *A. platanoides* 'Cavalier,' is well behaved, upright-oval and turns gold in fall; it's used in the triangle at Denny Way and Western Avenue and as a street tree on 31st Avenue north of Yesler Way.

For a big tree, we prefer the sturdy *Acer pseudo-platanus* (sycamore maple) to the overused plane tree or sycamore (*Platanus*), and it is more typically a tree of climates like ours. Since sycamore maple can take salt-spray exposures quite well, we have used it on Elliott Bay, between the bikeway and the water near Pier 86; we have also used it as a street tree (in its pyramidal form) on Denny Way and on Roosevelt Avenue NE.

The twiggy trees that look like little Lombardy poplars on NE 45th street, in the middle of the University district, are pyramidal hornbeams *(Carpinus betulus* 'Fastigiata'). This is a distinctive tree for small spaces and narrow planting strips. We've planted over 600 of them to screen the industrial area along W Marginal Way SW, and another large planting is on 35th Avenue SW, north from S Roxbury Street.

A notable screening planting, not a City effort but one done jointly by the Magnolia Community Club and the Burlington Northern Railway, is beginning to soften Magnolia's view of the railroad yards. On the east edge of Gilman Avenue W, it features evergreen incense cedars (*Calocedrus decurrens*), tough trees that will grow to 75 feet or more and survive the dry gravel bank and near-zero maintenance on the site.

Performing well for us in Ballard is an experimental planting of a little-known tree, *Pterocarya fraxinifolia* (Caucasian wingnut). This fast-growing tree has rather tropical dramatic, large compound leaves like a bolder black walnut; it's an exciting tree. Also in Ballard, in the main business district is another (appropriately!) Norway maple form, *Acer platanoides* 'Emerald Queen,' yet another good maple.

We've planted 75 *Ginkgo biloba* trees where they have lots of room to grow to giants (in Philadelphia, 200-year old ginkgos have six-foot trunks) in an industrial park on Industrial Way S, which reaches northwestward from Airport Way S under the big electrical transmission lines — the trees are 50 yards south of the lines. Ginkgos are popular in East Coast cities, rarely seen in Seattle. They look like awkward teenagers for about 15 years, then fill out into magnificent troublefree trees that should brighten Seattle skies each autumn for the next few hundred years with their butter-gold color.

For that same intense gold color in North Seattle, look this fall at Northgate Way west of the freeway, and Meridian Avenue N, from Northgate Way south to North Seattle Community College. This 300-tree planting of *Liriodendron tulipifera,* also called tulip poplar or tulip tree, will be beautiful at maturity, but we shall not use it often as a City street tree. Its fleshy root system resents transplanting; mortality in both the original and replacement plantings averaged over 25 per cent the first two years, an unacceptably high figure. This magnificent tall streetside tree is for the homeowner who can give it the initial tender loving care it requires.

Another West Coast favorite for fall color is sweet gum *(Liquidambar styraciflua),* native of the southeastern United States. It is a shapely column, and its leaves in reds, golds and maroons sometimes stay on the trees past Christmas. See it on Stewart Street, from the freeway downtown, and on Fourth Avenue from Stewart Street clear to Yesler Way. It is used as a theme tree in Montlake on 24th Avenue, also on Roy Street north of Seattle Center, and elsewhere.

***Pterocarya fraxinifolia* on 24th Avenue NW in Ballard.**

Photo: G. Pirzio-Biroli.

Rivaling it for fall color is a relatively new and superb small pear, *Pyrus calleryana* 'Chanticleer.' Chanticleer has so-so white blossoms, only a few very small fruits, but an upright tight-compact habit and shiny bright leaves that turn to vine maple colors in fall. Our plantings are south of Cherry Street in the Central area — look on 31st and 32nd Avenues. This tough, pollution-tolerant tree is making outstanding marks in many American cities; it will certainly be much planted as it becomes freely available. It is ideal for semi-formal effects.

Several oaks, all with bright autumn color, show promise. Perhaps the best we've tried is *Quercus shumardii,* the Shumard oak from Texas. Some lusty young specimens grace the triangle at Sixth Avenue and Denny Way. *Q. shumardii* is a smaller version of *Q. borealis* (northern red oak), the tree on Fourth Avenue between downtown and Seattle Center. Shumard oak has more attractive leaves, smaller, more graceful growth, and more variety in fall color. There is a 50-tree planting of *Q. shumardii* on Rainier Avenue S, a street which also has two other oaks, *Q. phellos* and *Q. coccinea.*

Willow oak *(Quercus phellos)* looks more willow than oak, with leathery willow-like leaves completely unlobed. It is a favorite street tree on the southeastern United States seaboard where it is native, and it appears to like Seattle — some of our best specimens are on Dearborn Street just west of the freeway.

Willow oak colors wine-red in autumn, but the most brilliant fall color belongs to scarlet oak (*Quercus coccinea*) planted on Rainier Avenue S down near Rainier Beach. Most oaks are difficult to transplant; *Q. coccinea* is one of the worst, but once growing, oaks are resistant to pests, vandals and diseases, and have the virtue of very long life. We have about 70 scarlet oaks at present, and will perhaps add that many more. Trees like this add real spice to our plantings; without the spice, the long plantings of "easier" trees can finally tend toward monotony.

In Wallingford, on triangles on Midvale Avenue N at N 45th and 46th Streets, we've experimented with *Quercus ilex* (holly oak), a tree often suggested for Seattle, because it is evergreen and thrives in parts of England. The Wallingford sites are apparently a bit cooler than *Q. ilex* likes, for the trees are growing only two to three inches a year and one of the six died after three years. On warmer sites nearer the salt water, holly oaks have grown better, but the Wallingford growth response is simply too slow to recommend extensive Seattle street tree use of *Q. ilex* in other than really warm exposures.

Seattle's streets have a lot of lindens on them. When these mature they will perfume the summer air with their characteristic delicious European "lime tree" fragrance. *Tilia cordata* (little-leaf linden) is planted on Ninth Avenue between Spring and Jefferson Streets on First Hill. Its compact variety 'Greenspire' is on Airport Way S, beginning a few blocks south of S Spokane Street, and in the Fremont neighborhood.

Another *Tilia cordata* variety, planted on Seattle streets while still under test number, has subsequently been named 'Bicentennial,' and we have possibly the longest planting in the world, 3½ miles on Roosevelt Way, Pinehurst Way, and 15th Avenue NE, from NE 80th Street to the north city limits. Bicentennial is compact like Greenspire, making a nice smaller street tree for residential areas, rarely reaching beyond 35 or 40 feet.

Norway maples *(Acer platanoides)* on Market Street in Ballard. 'Emerald Queen' is one of the cultivars used here.

Photo: J. Pirzio-Biroli.

A lesser-known European hybrid linden, called 'Orebro' is an attractive tree on California Avenue SW, extending south from SW Admiral Way.

We've used fewer flowering trees — most of them bring higher maintenance costs — but in residential areas several are proving outstanding. *Prunus sargentii* (Sargent's cherry) matches the smaller-scaled Greenlake business buildings. Sturdier than most cherries, it makes a strong showing of bright pink blossoms.

Prunus subhirtella 'Autumnalis' the winter-flowering cherry, gives too light an effect to be an effective street tree, but clusters of these work well in three pocket-sized parks along Lake Union, bordering Fairview Avenue E (See *Sunset Magazine,* April, 1977.) These parks are little people-places, with benches, for watching ducks, boats and the water, and the trees add extra winter interest to a place that gets all-year usage.

Prunus padus (European bird cherry), a delightful and little-known tree, adds almond fragrance to its frothy white flowers in May on Ballard's NW 57th Street, extending west from 15th Avenue NW, and variety 'Spaethii' of the same species is used on South Park streets.

Mongolian goldbark bird cherry *(Prunus maackii)* has somewhat similar blooms to go with honey-gold bark; see it in a two-block planting west from 24th Avenue NW on NW 62nd Street. This tree is hard to find, but we may seek more, as it is a first-rate tree for winter bark effect.

Most flowering crabapples (*Malus* species and hybrids) require frequent sprays to control disfiguring apple scab disease; we use only a few of these. Resistant varieties we've liked best have been 'Snowdrift' and 'Wintergold,' both with white blooms and golden fruits, and 'Van Eseltine' and *M. tschonoskii,* both in pinkish shades, the latter paler, looser-conical, growing to 35 feet with good fall color. These crabapples have been planted on Leschi and South Park residential streets.

Some trees we have planted were mistakes, granted the gift of hindsight. Which wouldn't we plant again? Certainly not Seattle's sycamores, specifically London plane trees *(Platanus × acerifolia).* This tree with maple-like leaves is tough and durable, growing quickly to sizes to be reckoned with. It gained fame from its ability to withstand the coal-dust and industrial fallout of London and Paris, and later of New York and Philadelphia. It has even done pretty well against California's exhaust fumes, though increasing pollution damage on London planes is starting to appear around Los Angeles and San Francisco. It is a majestic, long-lived and giant tree, but far too muscular for the spaces for which it is often prescribed. Our trees are teenagers only 19 years old; 50-year old London planes in Salem, Oregon (still young trees) have trunks over four feet through and tops that spread a hundred feet! These are trees that need room to stretch.

London planes surpass all trees in their ability to break concrete sidewalks and streets and to invade sidesewers and sewer mains. Our 400 London planes can sometimes raise sidewalk panels one-half inch every six months! They cause us more damage claims for injuries from falls than our nearly 20,000 other trees — about $10,000 last year. On Fifth Avenue and around Seattle Center, Seattle taxpayers pick up the tab for sidesewer cleanouts at 25 separate addresses up to four times yearly, and the number of addresses on the list — and the cleanout frequency — is growing. In 1976 roots from the Fifth Avenue trees totally blocked the 12-inch sewer main serving that street.

London plane trees are the only trees on which we pay sidesewer cleanout bills, the only trees which have broken into our sewer mains, the only trees we've found cracking building fronts and concrete slabs 50 feet back into the building. They discharge irritant hairs from the leaves in spring, something not generally known and perhaps of no concern to most people. But it is serious enough to cause several local nurseries and tree services to issue masks to employees who work in them, confirmation of a problem mentioned by Donald Wyman in his *Trees for American Gardens*. In the northern United States, including Seattle, they may suffer severe attacks of anthracnose disease in cold wet springs unless they receive a series of three sprayings; we've lost young London planes to anthracnose.

I have a two-inch "London Plane" file in my office, and based on information in that file we have placed this tree on our non-recommended list for future Seattle street planting. We don't prohibit the tree; citizens who wish may continue to plant London planes. However, though we'll keep those we have as a lesson for the future, we will not make further plantings to be maintained with public funds. Seattle's experience has been that London planes cost three to five times more to maintain than alternative trees.

We're not alone in our recommendation; Vancouver, B.C. and Tacoma both list it as unacceptable. The University of Illinois, with the most extensive program of street tree evaluation in the United States recommends that all *Platanus* species be on Illinois' restricted list. Chicago stopped using London planes as street trees 10 years ago. Philadelphia, whose quarter-million London planes are the largest planting in the United States, is disenchanted with the tree and doesn't recommend it according to Robert McConnell, director of the Fairmount Park Commission which oversees Philadelphia's trees. Cleveland uses London Planes only where tree lawns (planting strips) are wider than six feet. New York City officials, who believe the tree is a useful street tree, restrict its planting to a single borough because of admittedly higher maintenance costs which they don't wish to incur in other parts of the city.

We would not plant *Gleditsia triacanthos* var. *inermis* (thornless honeylocust) as a street tree again except in its upright selections like 'Shademaster' or 'Skyline.' Our plantings of the above species on Fourth Avenue think they are umbrellas and must be pruned two or three times each summer to get them back up out of pedestrians' faces. We wouldn't repeat flowering crabapple 'Profusion'; it is very susceptible to apple scab and mildew here. *Sophora japonica,* a tough, foolproof street tree in eastern United States cities, repeatedly gets canker attacks in Seattle and usually dies within two or three years in spite of our efforts; we won't plant more of it. *Crataegus laevigata* (*C. oxyacantha,* English hawthorn), probably best known in its variety 'Paul's Scarlet,' is beloved of aphids which excrete sticky honeydew all over sidewalks or cars beneath if they're not sprayed several times each summer; we use *C.* × *lavallei* (Carriere thorn) or *C. phaenopyrum* (Washington thorn) as alternates that are less likely to be attacked.

So there are the street trees we like better and those we like less, based on Seattle experience. Evaluation of any tree might conceivably change if the site or circumstances were altered.

We strongly believe in a good mix of street trees. In Seattle, we've used about 35 species and varieties in significant quantity and twice as many more in small experimental plantings. Our streets can't be denuded by an epidemic like Dutch elm disease or chestnut blight; no one tree variety on our streets makes up over 10 per cent of the total.

Finally it is my hope that before long Seattle can have some protective ordinance (I'm working on one) to give some standing to old, historic or significant trees in the city, so that they aren't casually cut down for short-term use of their space. As I write this, preliminary steps are being taken toward seeking historic landmark status for at least one Seattle tree on Capitol Hill. I'm troubled when I see that doomed old cherry tree in midblock between First and Western Avenues, north of Virginia Street, due to be removed in September for an $8-million building, though I respect the fact that it did receive thoughtful discussion before the final decision was made.

I'm compiling a list of historic or noteworthy Seattle trees so that people can know about them. Most of the knowledge of such trees, other than from tree people like Joe Witt or Brian Mulligan, will have to come from interested citizens who volunteer the information. I welcome information from anyone who will contact me. There has been a major change in the way Seattle thinks about its trees; we're becoming proud of our trees, noted for our plantings. Now perhaps publicity and recognition of some oldtimers can keep us from losing some of the oldest stars in Seattle's leafy crown.

Growth of a Collector's Garden

*BRIAN O. MULLIGAN**

This is an account of the gradual building of a garden near Seattle over more than a quarter century by two plant lovers, using experience acquired first in English gardens, later with native and introduced plants around Puget Sound. Because of its length, it will be continued in a future issue.

When we acquired this property of nearly two acres half a mile northeast of Lake Washington and two miles north of Kirkland early in 1951, the existing "garden" chiefly comprised a haphazard collection of plants.

There was an orchard in mown grass, mostly of apple trees of two different age groups. There were some raspberry canes, three large native dogwood trees *(Cornus nuttallii)* and a couple of European mountain ashes *(Sorbus aucuparia)* of similar age, probably planted when the house was built in the 1920's. A lilac bush erupted in May with showers of white panicles. On the bank between the house and the driveway, facing west, were some miscellaneous plantings of candytuft, *Arabis* and ivy. A double row of filberts stood south of the house. There was also a broken-down fence which we have since replaced.

However, the prospect was encouraging. The soil was sandy and presumably well drained, offering the promise that it could be easily worked and improved. The size of the fruit trees indicated that it was of some depth and fair quality. The land sloped gently to the west and was protected by belts of native trees on both north and south sides. Those trees on the north were part of the property, the south belt was not.

We began operations by removing the two mountain ashes, since they were too close to the house and to a small enclosed barbecue immediately behind it. At an early stage also we added to the apple collection to extend the season and variety. Gradually the filberts have been thinned out, since they occupied valuable space and are greedy trees with extensive root systems and sucker growths; also their principal beneficiaries are the jays and squirrels, two pests which are difficult to cope with.

Foreseeing that eventually the land to the south between us and a busy road would become built-up, we planted a short hedge of seedling hollies *(Ilex aquifolium)* alternating with native true firs and spruces (A).** This has proved most successful both as a screen and a windbreak and is now 15 to 20 feet in height. It is supplemented by a pair of taller Engelmann spruces *(Picea engelmannii)* just north of it.

At the extreme southwestern corner of the property is a group of evergreen trees and shrubs that further screens us from traffic (B). *Cupressus macnabiana* from northern California has produced cones amongst its sage-green branches and is now 17 to 18 feet tall. In the foreground is a bush of the strawberry tree *(Arbutus unedo)* cut to the ground twice by cold winters but now again up to eight feet or so and flowering freely in October; in some years we also have a crop of fruits. A tall specimen of the hybrid holly, *Ilex* × *aquipernyi,* occupies a prominent place here, but unfortunately is a male tree and bears no fruit.

The bank below and west of the house (C) was planted during the mid-1950's with several kinds of dwarf conifers, because they would be permanent inhabitants and require little maintenance. Amongst them is a Sargent's weeping hemlock (*Tsuga canadensis* 'Pendula'), now about four feet in height and seven or eight feet across. One of the many dwarf forms of the Port Orford cedar *(Chamaecyparis lawsoniana)* perhaps 'Knowfieldensis,' bushy and dark green in coloring, is now some six by eight feet in size. Behind these is a native mountain hemlock *(Tsuga mertensiana),* one of the best of the smaller conifers for this area, growing slowly and having no apparent problems.

Lesser shrubs on this bank include that most useful and fragrant hybrid *Daphne* × *burkwoodii,* producing quantities of pale pink flowers in late April and early May. There is also the natural hybrid *Arctostaphylos* × *media,* which is found wild in Mason and Kitsap counties, Washington,

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*It is always interesting to learn what plants a former arboretum director and his collector wife consider worthy of inclusion in their own garden. We know that our readers will enjoy the description on these pages.
**Letters in parentheses throughout this article refer to those locations indicated on the accompanying map drawn by Sally Dickman on pages 20 and 21.

The south side of the house described on pages 19 and 20. *Carpenteria californica* on left, and *Eucalyptus perriniana* on right (see cover photo for detail). Photo: Brian O. Mulligan.

growing with its two parents, *A. columbiana* and kinnikinnick *(A. uva-ursi)*. The last has also proved to be a very useful ground cover, planted here in several different forms from both mountain and seacoast sources. Flowering at about the same time in May are the rich pink, highly scented *Daphne cneorum,* which needs a sunny site to remain compact and flower regularly, and our native *Penstemon fruticosus* with tubular, lilac-purple blooms. These are followed by two kinds of *Aethionema,* of which we prefer the deeper pink of *A. grandiflorum* to the paler *A. armenum*. Several kinds of thymes and *Dianthus* and the almost perpetually blooming *Lithospermum diffusum* act as ground covers between the shrubs. At the foot of the bank we have added in recent years various kinds of *Lewisia,* especially seedlings of *L. cotyledon* which flower also in May in different shades of pink, pastel shades or near red. Species of *Tulipa* and *Crocus* enjoy this warm, well-drained situation, if the slugs can be prevented from destroying their leaves and buds when they emerge.

Two short flights of steps lead from the driveway to the front door (D). The lower one is flanked by two large native western red cedar trees *(Thuja plicata),* no doubt planted at the time the house was built; they are now 28 and 32 inches in diameter at breast height. Ivy covers the bank on the north side of the steps, but amongst it *Cyclamen hederifolium (neapolitanum)* grows well and flowers annually in September. The narrow path leading up to the second flight is bordered on both sides with a mass planting of *C. coum,* blooming in February whatever the weather may be, a season when such a mass of highly colored small flowers is most welcome.

In a wider bed across a small lawn area to the north of this path are two large deciduous azaleas. One, flowering in April, is *Rhododendron schlippenbachii* from Korea, one of the most beautiful spring-blooming shrubs we have, with its quantities of large, wide open pale pink chalices. The other is the centenarian hybrid *R. viscosepalum* 'Daviesii,' raised in England in the 1870's, which produces its creamy-white, highly fragrant flowers in mid-May. The former is now seven to eight feet high, about ten feet in width; the latter is somewhat smaller. Adjacent to them is a group of *Sarcococca hookeriana* var. *digyna,* grown as a tall ground cover as well as for its very fragrant though insignificant flowers in February; beside it is the smaller var. *humilis,* only a foot or so in height, having black instead of dark purple fruits in the following winter and early spring. Both spread by underground stems and tolerate remarkably well the shade and root competition from the *Thuja* trees.

Another border on the south side of the steps leading up to the house and facing west contains established plants of the evergreen shrubs *Stranvaesia davidiana,* now about eight feet tall, and beneath it the more or less prostrate variety *undulata*. These bear loose corymbs of white flowers in June, but their greatest value comes during the winter months when they are decked for weeks with bunches of bright red "berries" which the birds fortunately leave alone until late in the winter. Behind them, against the house, is an old plant of the vigorous climbing hybrid rose 'Mermaid,' which displays a succession of its large pale yellow blossoms from late June until October — a very ornamental rose of this type, but beware of its strong hooked thorns!

Beside these steps is a plant of the Japanese heavenly bamboo *(Nandina domestica)* which

has flowered but not produced its red fruits for us; perhaps it needs a mate for cross-pollination. Between the stranvaesias and a *Carpenteria californica* on the southwest corner of the house we have recently planted another shrub from eastern Asia, the Japanese anise *(Illicium anisatum),* an evergreen with fragrant foliage and small ivory-white flowers in April and May.

In 1958 we added a small wing to the east side of the house which shelters a patio (E) facing east and south and the shrubs planted against the east wall of the house. These include winter sweet *(Chimonanthus praecox),* now some 12 feet tall and nearly as wide, which flowers regularly in January and February each year. The semi-double pink *Camellia sasanqua* 'Jean May,' in the corner next to the house and reaching up to the roof line, performs well in November and December, if the weather is mild. The winter jasmine *(Jasminum nudiflorum)* is trained to the wall between them so that we usually have some flowers here in view from the windows from November to February.

Across the patio to the east a low brick retaining wall protects the flowers of the Algerian winter-blooming *Iris unguicularis (I. stylosa),* as well as those of the fall-blooming *Schizostylis coccinea* and its pink form 'Mrs. Hegarty.' In the summer this warm border is filled with succulent plants such as *Aeonium, Echeveria* and *Sedum* species from the Canary Islands, Mexico and elsewhere; these spend the winter and early spring months in the greenhouse.

The brick wall supports a narrow border containing several plants of interest or ornamental value. At its south end is a healthy specimen of one of the smaller forms of the Japanese Hinoki false cypress *(Chamaecyparis obtusa),* perhaps 'Compacta,' now about six feet tall and three feet wide, whose shoot tips are chartreuse-colored in spring and early summer.

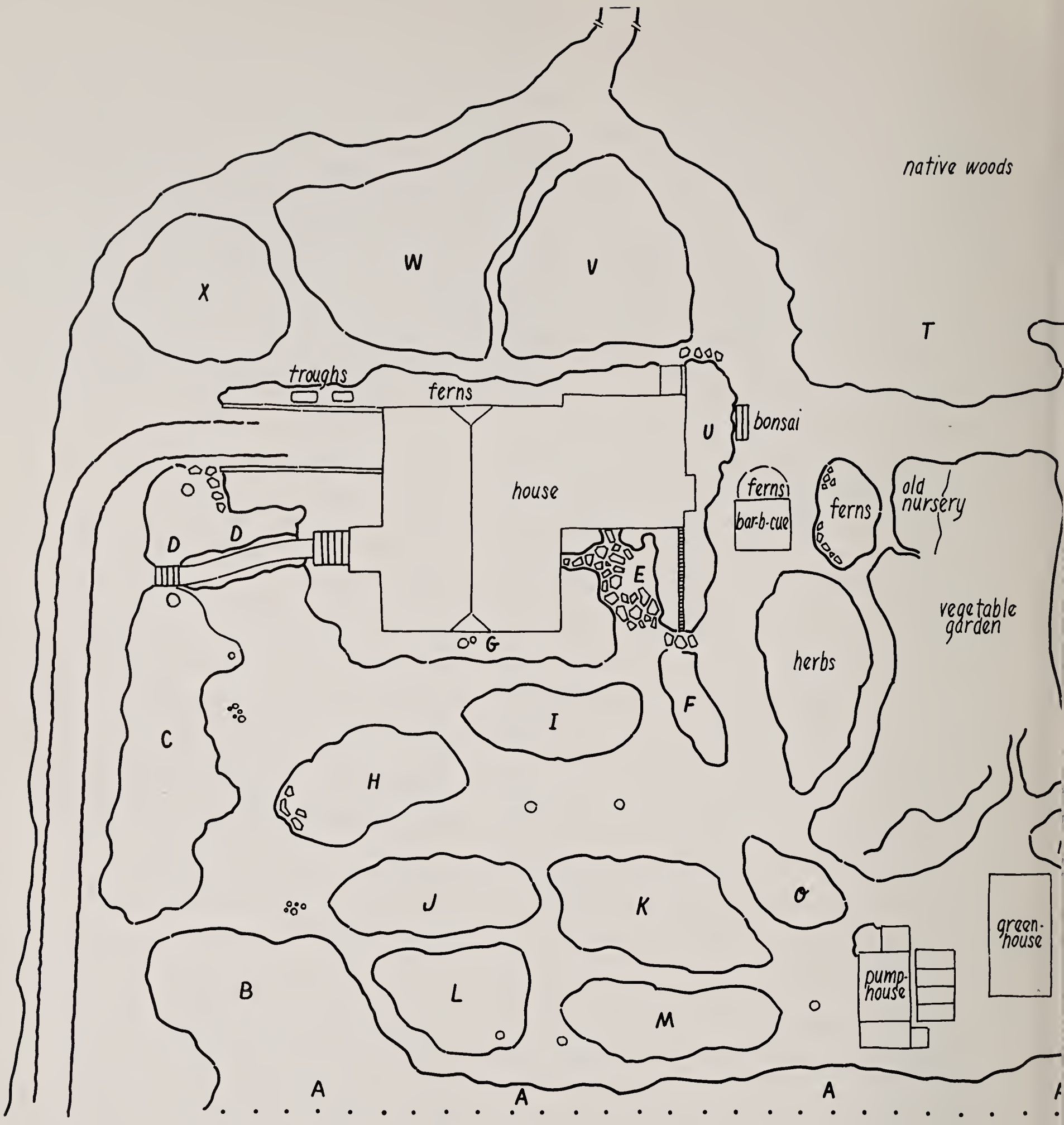
North of it and in the center of the border is a mature example of the invaluable Chinese *Daphne retusa,* which has grown in 20 years to be 32 inches high by 48 inches wide. After flowering in April each year, it produces a crop of red fruits in July and August before flowering again more sparingly in August and September. The heavy wet snowfall of December, 1976 opened up the center of the bush but it subsequently recovered its normal shape. For both flowering and fruiting qualities it is certainly one of the best of its genus. Between it and the southeast corner of the house is our original plant of *D. blagayana* from southeastern Europe, a species of totally different habit, creeping over the ground but rising to a height of about 20 inches. In March each shoot is terminated by a cluster of extremely fragrant white flowers, delightful to cut and bring into the house at that season. Although it forms no fruits here, it can be propagated by cuttings in summer.

Across the grassy walk to the east is a short hedge of the dwarf purple-leaved form of *Berberis thunbergii,* named 'Atropurpurea Nana,' an excellent shrub for such use, especially as it always provides a crop of oblong red fruits in the fall. Beyond this is a bed containing a number of herbs useful in the kitchen, including mint, chives, sage and thyme.

Soon after the extension was added to the house a small scree bed for rock plants was dug in the grass area just south of the patio (F). Although considerably shaded by one of the large old native dogwood trees, some plants have done well under these conditions, notably a specimen of *Tsuga canadensis* 'Hussii,' now some eight to nine feet high and five to six feet wide. Two other much smaller conifers are *Chamaecyparis obtusa* 'Nana Gracilis,' and the very slow and compact little *C. pisifera* 'Plumosa Compressa,' now measuring two feet high and wide and conspicuous in spring and early summer with its yellow tips on all the new growths.

Beneath the *Tsuga* is one of our two plants of *Daphne collina,* native to southern Italy but perfectly hardy here, producing numerous sweet-scented lilac-purple flowers in terminal heads in April. At the top of the scree bed is a happy small plant of *Daboecia azorica,* a relative of the heathers from the Azores islands, which in early June sends up a number of short stems bearing bright crimson bells. In cold spells we find it advisable to give this plant some overhead protection. Also on this bank are thriving plants of *Dryas octopetala* and *Salix reticulata,* and one of the "whipcord" *Hebe* species from New Zealand, *H. lycopodioides,* which has yet to produce flowers for us although its olive green stems and leaves have year-round value.

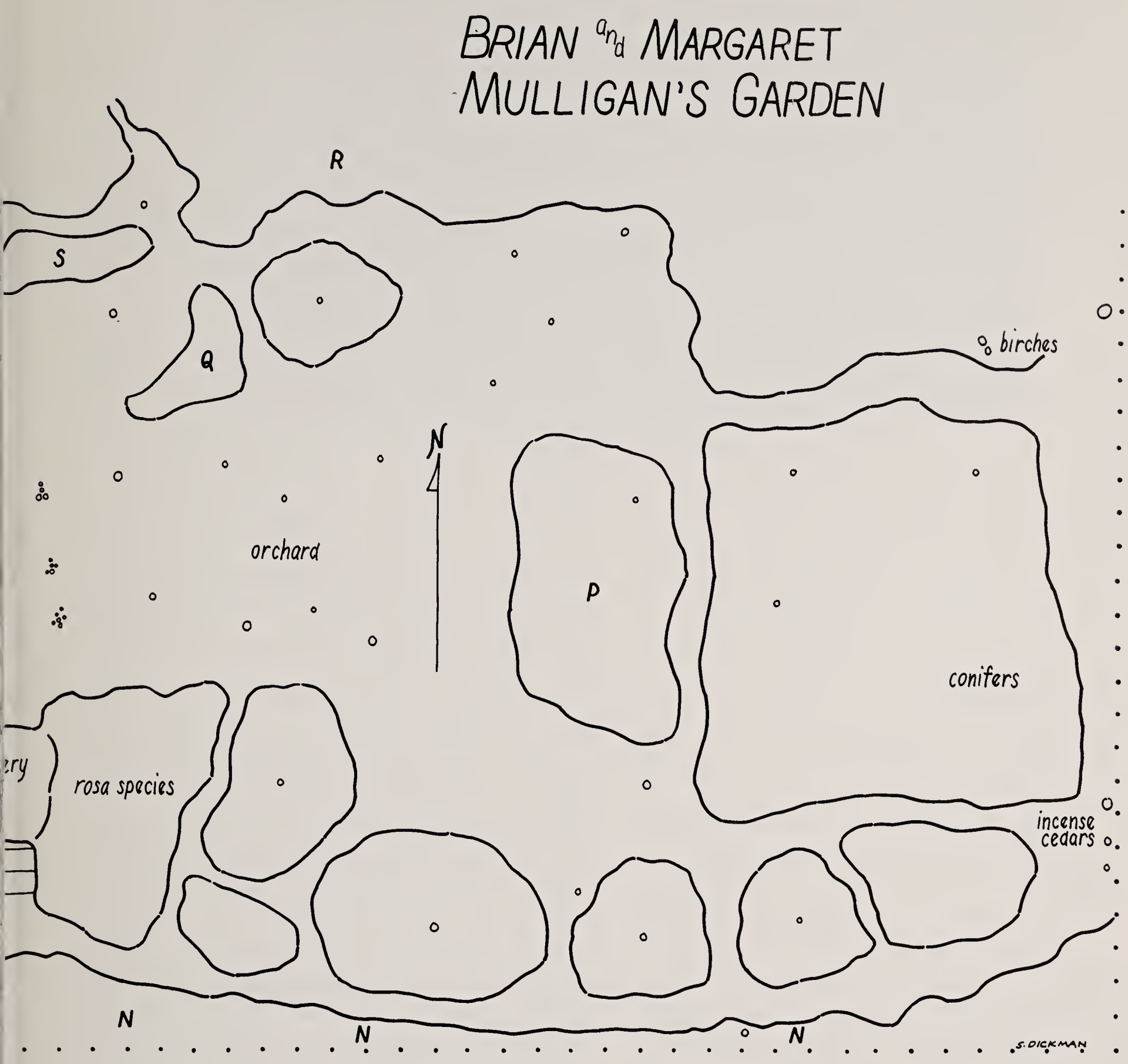
In a narrow border along the south side of the house (G) is growing a selection of plants which enjoy plenty of sunshine. Most prominent among them is a tree of *Eucalyptus perriniana,* killed to the ground twice by cold but now 10 feet above



the roof ridge and flowering annually. At the southwest corner the large shrub of *Carpenteria californica* eight feet high is laden with quantities of its delicately scented, snow-white 2½-inch saucer-shaped flowers in mid- to late June, one of the best plants in the garden at any season. Amongst other smaller shrubs is the gray-leaved, yellow daisy-flowered shrubby hybrid *Senecio,* now to be called 'Sunshine' instead of *S. laxifolius* or *S. greyi.* Continuing the gray color scheme is the rue *(Ruta graveolens)* and a bushy *Hebe* about two feet in height. In March and April we enjoy the chartreuse flower heads of a large clump of *Euphorbia wulfenii* towards the east end of the border, which is terminated by *Genista lydia,* a mass of gold in June.

Between the beds near the house and the south boundary is an area about 70 by 80 feet which contains several beds filled with a variety of both woody and herbaceous plants that provide interest and color over a large part of the year.

Directly south of the house two of these beds



are of irregular but more or less oval form, their longest axes running east and west down the slope.

The lower western one (H) was constructed first and acts in part as a screen from the road, thanks chiefly to a pair of sweet bays *(Laurus nobilis)* now 18 to 20 feet in height, although twice killed to the ground by cold winters. They flowered profusely in April this year, probably because of the unusually dry and sunny weather of August and September, 1977. Immediately above them is a mature specimen of Chinese witch-hazel *(Hamamelis mollis),* a gift from the late Carl S. English, which is now almost as tall as the bay trees. This plant normally produces a profusion of golden yellow, sweet-scented flowers in January each year, continuing for about a month. In October the leaves turn butter-yellow before falling. It is indeed a most valuable shrub.

Another large shrub close to the *Hamamelis* is a mock orange, received as *Philadelphus cali-*

fornicus but probably a hybrid. It is now approximately 18 feet high and on a level with the second story windows of the house, from which its masses of highly fragrant white flowers can be fully appreciated in mid-June. It has also produced a seedling against the house which is similar in characters to the parent. Just below the *Philadelphus* on the north side of this border is a handsome dome-shaped specimen of *Tsuga canadensis* 'Cinnamomea,' now 4½ feet high and 8 feet wide, which we acquired many years ago from Mrs. L.N. Roberson of Seattle. It is certainly one of the most attractive forms of this variable eastern species of hemlock.

One of the three original native dogwood trees formerly stood here but died from root rot. The other two are still with us in a lawn area, but affected in differing degrees with the same problem. We have planted three seedlings nearby to succeed them, one of which has flowered.

On the southwest corner of this bed is a group of the native *Penstemon fruticosus* var. *scouleri,* raised from cuttings collected a few years ago near Orondo, Douglas County, Washington, on the east bank of the Columbia river. They seem quite happy here in this dry situation, flowering rather sparsely in late April or early May. The rich orange-yellow form of *Iris innominata* close beside them does better a little later in May, even though it is more shaded. These are seedlings derived from a form known as 'Reiter's Bronze' given us by Roy Davidson of Bellevue, Washington.

The upper bed (I) was planned principally to contain members of the family Ericaceae, with a background of native mountain hemlocks *(Tsuga mertensiana)* and subalpine firs *(Abies lasiocarpa)*. The main plantings were of three kinds of heathers: *Erica herbacea (E. carnea)* 'Vivellii' for late winter and early spring bloom, with *E.* × *watsonii* 'Dawn' and *E. vagans* 'Mrs. D.F. Maxwell' for summer color in succession. However the last became too large for the well-being of its neighbors and was gradually removed, while the habit of 'Dawn' proved too loose and unkempt; only one plant now remains. 'Vivellii' is as good as ever, compact, free-flowering, brightly colored, no more than a foot in height.

Amongst other plants thriving in this closely planted bed, a condition which members of this family seem to enjoy, are a number of low-growing rhododendrons. A good pink form of *R. glaucophyllum* flowers in late April and the lighter pink hybrid 'Gene' a little earlier. There are two distinct forms of the dwarf, free-flowering *R. lepidotum* and the pure white form of *R. kiusianum* from southern Japan, a neat and charming small species, quite hardy here and apparently around the Puget Sound area. There are also smaller plants of *R. camtschaticum* and *R. keleticum* which tend to flower less freely than the others. The most uncommon plant here, however, is one of *R. albiflorum,* planted some eight to ten years ago and now 30 inches tall, growing satisfactorily if slowly and flowering occasionally and sparsely.

Species of *Gaultheria* in this bed are *G. hookeri (G. veitchiana)* with its rich blue berries in early fall, *G. adenothrix* from Japan, producing red fruits on its creeping stems, and the low-growing, bushy, white-berried *G. cuneata* from western China. An unusual and potentially useful *Pernettya* is *P. mucronata* var. *rupicola,* acquired from an Irish garden some years ago, now a dense little bush some three feet tall and almost as wide, smothered each May with the typical tiny white bell flowers of this species, but probably a male form since no fruits have been produced. This variety would seem to have considerable possibilities as a low hedge plant. The intergeneric hybrid *Gaulnettya* 'Wisley Pearl' *(G. shallon* × *P. mucronata)* is doing well.

Our native *Vaccinium ovatum* and the very slow-growing *V. deliciosum* from our mountains both thrive here. *Andromeda polifolia* is about the same size as the latter, having attractive grayish foliage the year round but flowering only sparingly for us. The neighboring *Cyathodes colensoi,* also shy-blooming, a member of the family Epacridaceae from the mountains of New Zealand, is heather-like in its habit and foliage.

Two successful evergreen ground covers here are the partidge berry of the eastern United States, *Mitchella repens* (although it has not yet produced its small red fruits for us) and the hybrid *Epigaea* × *intertexta* 'Apple Blossom,' raised by an English nurseryman in 1928 by crossing the American *E. repens* and the Japanese *E. asiatica.* For vigor and greater ease of cultivation this is certainly superior to both its parents; it flowers freely in May and is an outstanding example of how long it takes to get a good garden plant into general circulation.

South of these beds are two others (J and K)

***Laurus nobilis* blooming in May, 1977. Photo: Brian O. Mulligan.**

where principal place is given to a plant of the original *Camellia* × *williamsii* hybrids, 'Mary Christian' and 'J.C. Williams,' now respectively eleven and nine feet high, both flowering in April. Of the two we prefer the former for its richer pink and more campanulate flowers; it is also a little earlier by about ten days.

In front of the 'J.C. Williams' in the bed nearer the house (J), a thriving plant of the variegated form of *Kerria japonica* about four feet high brings a light and airy touch in summer. It flowers freely in May, as does a large plant of *Rhododendron yunnanense,* annually covered with myriads of its almost white flowers with crimson spots in the throat. The highly fragrant Oregon azalea *(R. occidentale)* does not bloom until June and is more welcome for that reason.

The filbert tree at the west end of this border supports a stout old plant of the most virogous climbing rose 'Polyantha Grandiflora,' which in mid- to late June annually erupts into a cloud of scented white blossoms, completely smothering the nut tree. It is an admirable plant for such a purpose and, like many other roses, can be propagated by cuttings taken in October.

Beneath it as ground covers are several kinds of epimediums and two species of the closely related genus *Vancouveria:* the deciduous *V. hexandra* and the more attractive evergreen *V. planipetala,* a native of southwest Oregon and northern California. An unfortunate introduction from Ireland a few years ago, the variegated form of the yellow dead-nettle, *Lamium galeobdolon,* is too rampant and will have to be thoroughly eliminated.

The two beds nearest to the south boundary (L and M) are parallel to the fence and have the largest plants in the rear: the three remaining filberts, with *Clematis armandii* climbing over one; a *Rhododendron discolor,* which finds the site a little too sunny and warm for it in the summer, since there is no afternoon shade; a big *Hamamelis mollis,* too much shaded by the neighboring Engelmann spruces; a fine plant of that excellent rhododendron 'Unique' and others of 'Bow Bells,' 'Jock,' 'Fabia' and the late-flowering 'Arthur Osborn.'

We have learned over the years that the larger rhododendrons especially do not enjoy exposure to the afternoon sun in July and August on this sandy soil. Most of them, therefore, are planted along the south boundary fence east of these beds, facing north and protected by tall native maple and alder trees behind them (N). We have a selection of both species and hybrids along this border, including *R. wardii, R. campanulatum* of a very clear lilac color, *R. lutescens* and *R. oreotrephes.* Among the hybrids are 'Helen Schiffner,' 'Idealist' now some nine feet in height, and 'Edward Dunn' with its peach-colored flowers in June. Isolated up at the end of the property is 'Anna Rose Whitney' with its huge trusses of bright rose flowers at about the same time. There are also several of the late Halfdan Lem's hybrids

of *R. bureavii* with *R.* 'Fabia' and of his early-flowering 'Replet.' Endre Ostbo's 'Yellow #1' flowers at the same time and is of much the same color as 'Edward Dunn'; it was a gift from him in 1955 and is now eight feet tall.

Southeast of the patio, with the pumphouse and greenhouse beyond, is a small triangular bed some ten years old (O). Its chief feature is a vigorous young Serbian spruce *(Picea omorika),* planted in 1968 and now 18 feet tall, which first produced cones in 1977. Beneath it is a plant of our native evergreen huckleberry *(Vaccinium ovatum)* selected for the mahogany-red coloring of its young shoots in spring; we are propagating this color form. At ground level beneath it is a single plant of the small shrubby *Spiraea* named 'Normanii' which traces back to the garden of the late Mrs. T.C. Frye in Seattle, and is no doubt a form of the variable *S. japonica.* Although it has not flowered, we value it for the brilliant red fall color, which lasts for about a month in October and November. If propagated in quantity it would be an excellent ground cover, since it only reaches about a foot in height. It was also distributed by Carl Starker of Jenning's Lodge, Oregon.

Most of the rest of this bed is filled with various kinds of *Calluna* and *Erica,* giving color and interest at different seasons, together with several plants of *Rhododendron hippophaeoides* which agrees well with them both in habit and foliage. The latter species gives us lavender-blue flowers in April. At the east end of this bed is a young plant of *Fothergilla major,* grown both for its tufts of white flowers and for its orange to red fall leaf color.

The greenhouse (19 by 10 feet) was constructed in 1972-73 following my retirement from the Arboretum with funds most kindly given me at that time by the Arboretum Foundation. It is used for two basic purposes: (1) to propagate plants useful for the annual sales of the Foundation, Northwest Ornamental Horticultural Society, Northwest Chapter of the American Rock Garden Society, various Units of the Arboretum Foundation, etc.; (2) to house plants not sufficiently hardy to withstand our average winters, such as succulent plants, tender species of ferns and rhododendrons, and pelargoniums. For propagation purposes it was fitted with a heated bench and overhead lights, and with these accessories we have been able to produce a large variety of young plants.

A set of four 6- by 3-foot frames was built at the same time on the east side of the pumphouse to contain young plants growing on in pots or flats; these are plunged in a mixture of soil, sand and Perlite to reduce water loss by evaporation. On the south side of the pumphouse are two smaller frames containing bulbs, mostly *Narcissus* species, *Crocus* and *Cyclamen,* which need a summer baking. To the east of the greenhouse are two more 6- by 3-foot frames filled with soil in which rooted cuttings can be planted directly and grown on until they are large enough to be planted out. These are chiefly used for ericaceous plants which do not like being contained in pots. Adjacent to them is a small nursery area for growing on young trees and shrubs to planting size in the garden or elsewhere. Protecting all these to the east is a group of old plants of several species of *Rosa,* now eight to ten feet in height, flowering profusely in June each year and fruiting equally well in September and October. The pink form of *Rosa moyesii* and a large specimen of *R. setipoda* or a hybrid thereof are the best of these.

(To be continued.)

Available from the Arboretum Office:
Hardback — $8.50;
Paperback — $4.75.

Photo: Jane Rogers.

Crocus cultivars, from left to right: 'Blue Pearl,' 'Snow Bunting' and 'Harlem Gem.'

8th Annual Arboretum Foundation Fall Bulb Sale

Wednesday and Thursday, October 4th and 5th

From 10 a.m. to 4 p.m.

Arboretum Office Parking Lot

The sale features 60,000 bulbs and hard-to-find native plants.

There will be demonstrations on:
- How to plant bulbs.
- How to force them in water or soil for indoor bloom.
- How to dry alliums for winter bouquets.

Consultations on bulb culture will be available.

This is a public sale. Bring your friends and garden club.

ARBORETUM ANNUAL REPORT

June 1, 1977 — May 30, 1978

JOSEPH A. WITT
Curator of Plant Collections

The last 12 months have been much less productive, if not completely sterile, in comparison with last year when so many long-pending projects came to fruition. Perhaps the major project finished during this period was the completion of the Update of the Master Plan for the Arboretum in Washington Park by Jones & Jones. The Update was finished in early 1978 and approved (with reservation concerning solutions to the traffic problem) by the Arboretum and Botanical Garden Committee soon after. This plan now must be approved by the University of Washington Board of Regents and the Seattle City Council. Action by these two bodies awaits an Environmental Impact statement being prepared by the Seattle Parks and Recreation Department, due in July. It seems possible that final approval may be in late 1978.

A report on the Updated Master Plan will likely appear in this *Bulletin* at a later date, but in essence it recognizes the value of the 1934 Olmsted plan and makes no serious changes in the present collections or their arrangement. Aside from the recommendations for improving the present impact of traffic on the Arboretum which probably will not be implemented until the City has made a thorough study of the entire traffic corridor, including the Arboretum, the major suggestions in the plan call for a new visitor center, replacement of the irrigation system, development of new planting areas and improvements in signing and labeling, and changes for the better in the system of lagoons, certain trails and paths. Perhaps the most important aspect of this planning is the recognition that Washington Park will be the display and public service arm of an expanded University Arboretum Program which will eventually include the Union Bay Teaching and Research Arboretum, the Macbride Arboretum at Pack Forest and the Bloedel Reserve.

Union Bay Teaching and Research Arboretum

The development of this arm of the Arboretum Program progresses slowly. A number of *Salix* species (willows) were planted along the western edge of the Arboretum site, partially to determine how well certain species would grow there and partially to form a screen along the water channel. The question of what will be done with the student housing, Union Bay Village, is not yet resolved, but should be by mid-year.*

Operations

Much of the ground work was routine maintenance and care of the turf and the collections. As in the past several years, removing diseased trees and unwanted brush occupied much of the staff's time. A number of trees along Lake Washington Boulevard E., both north and south of the Stone Cottage, were given a badly needed pruning and the shrub border south of the Cottage was cleaned for the first time in many years. With the help of the tree crew from the Park Department, a portion of the Oak Section along Lake Washington Boulevard was cleared to allow for future planting of oaks.

It has been our policy to restrict development of any new shrub or tree beds because of lack of staff to maintain them. However, one large area has been prepared for a future planting of American native azaleas, and we are experimenting here with a method which uses a heavy mulch in conjunction with a weed killer to keep the soil weed-free for a full year before planting. If this is successful, we should be able to plant in a clean bed that remains weedless for many months.

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*It was learned after this was written that an Environmental Impact Statement, produced for the University, suggests that the student housing be phased out at the Union Bay site and replaced by housing elsewhere.

Plantings

Some 300 trees and shrubs of 129 kinds were planted on the grounds during the year. No major collections were developed, but sizable additions were made to the lilacs and viburnums. A group of 33 rhododendrons of the Falconeri and Grande series were placed on the hillside above Azalea Way south of Loderi Valley where they will receive the protection of a canopy of large bigleaf maples.

Research

The Frost Hardiness Program continued with some expansion. Funds from the Arboretum Foundation's grant were used to purchase more cold chambers and control equipment for Dr. Kohn's laboratory, giving him the capability of testing much more material. During the winter of 1977-78, cold tolerance tests were run on 10 species selected from the Arboretum's collections of half-hardy trees and shrubs. Much of the material was collected and sent to Dr. Kohn on a bi-weekly schedule by a volunteer group interested in the project. In addition to cut branches, a trial program with seedlings as test material has begun. Several species of *Eucalyptus* and several of conifers are among the plants being tested with this technique.

The Arboretum is also cooperating in a program testing sewage sludge as a soil amendment for growing seedlings of forest tree species. A plot north of the office building is reserved for a number of soil treatments and is labeled with the type of soil and the tree species. In addition, a smaller test is being conducted in the greenhouse using composted sludge as a growth medium for a number of ornamental and horticultural plants.

Educational activities

The major accomplishment in this category was the training of a volunteer guide program for the entire Arboretum. Under the leadership of Mrs. Allen Moses, the guides received intensive training during the winter and spring months and prepared a "Guide for Guides" as a training aid. With this service, tours of the grounds are again available for groups such as garden clubs, a service formerly offered, but nearly discontinued because of the staff reductions experienced in 1972.

The staff was busy with public lectures, talks, and tours of the Arboretum grounds. Mr. van Klaveren gave 12 lecture-demonstrations on plant propagation, Mr. Powell discussed gardening techniques with a landscape architecture class from the University and gave advice and assistance to a group of people developing a park on Vashon Island. Mr. Witt taught a class in tree identification to graduate students in the College of Forest Resources and lectured to a soils class on the practical relation of soils to plants. In addition, he gave thirty lectures and tours.

Mr. van Klaveren attended the Western Regional meeting of the International Plant Propagators Society held in Claremont, California in October and attended a symposium on Horticultural Therapy in Vancouver, B.C. in March, 1978. The latter was funded by the Arboretum Foundation. Mr. Witt gave a lecture on the Union Bay Teaching and Research Arboretum to the Western Regional Meeting of the American Association of Botanical Gardens and Arboreta in San Diego in September and read a paper on the Frost Hardiness Program to the annual meeting of the same group at Hamilton, Ontario in May, 1978.

Miscellaneous

Without help from our numerous volunteers, life would be more difficult for the Arboretum staff and public services would be reduced to an even lower level. Again this year, for example, Unit 66 handled the International Seed Exchange, the Arboretum office was kept open on Sundays by a staff of volunteers and the Amigos de los Americanos removed weed trees from the "Pit" area as part of their annual work-a-thon.

The drought of the previous year broke in August, 1977 when over three times the average rainfall was recorded for that month. The year's total, however, was 35.2 mm (1.31 inches) short of our twenty-year average. This winter was mild as have been the past four winters, and in fact, we must go back to January, 1974 to find a minimum temperature below −6.7°C (20°F). Although a few very tender plants such as *Acacia* and some *Rhododendron* species were damaged by a sharp drop in temperature in mid-November, most of the half-hardy species have developed well.

Our library received several notable additions. The Northwest Ornamental Horticultural Society gave us the truly magnificent three-volume work

Flora Japonica by P.F. von Siebold. This is a first class reprint of an illustrated work published in 1826 and contains some of the best color plates of Japanese plants ever produced. The Seattle Garden Club donated a collection of fine illustrated books on gardens and gardening including Alice Lockwood's *Gardens of Colony and State* and *Rhododendrons and the Various Hybrids* by J.G. Millais. Unfortunately these volumes are not safe in our present facilities and must be kept in the University's main library. Everyone is looking forward to the day when our library can be reassembled and become available to the staff and public in safe and comfortable quarters.

Plants and Seeds Received and Distributed

The International Seed Exchange still remains our major source of plant materials. This year we distributed 3330 packets of seeds to 204 institutions and received 267 kinds in return. Brian Mulligan, Director Emeritus, brought back a fine collection of seeds and small plants from the British Isles in October and arranged for a shipment of unusual trees and shrubs from the Hillier Nurseries, Winchester, England. These latter, 22 plants in all, were purchased with funds supplied by the Arboretum Foundation. The Northwest Ornamental Horticultural Society gave a collection of 23 dwarf and low-growing plants and later 21 rhododendron cultivars, while Mrs. Mae Granston donated a fine group of 29 American azalea species.

The weather record and a list of important book accessions are given below:

WEATHER IN THE ARBORETUM — June 1977 to May 1978

	Precipitation		Temperature* High		Temperature* Low	
	mm.	in.	C°	F°	C°	F°
Jun	14.0	(0.55)	30.0	(56)	5.6	(42)
Jul	13.4	(0.53)	30.0	(86)	8.3	(47)
Aug	135.3	(5.33)	35.0	(95)	10.0	(50)
Sept	75.3	(2.96)	24.4	(76)	5.6	(42)
Oct	76.6	(3.02)	20.0	(68)	4.4	(40)
Nov	111.4	(4.39)	15.6	(60)	−6.2	(20)
Dec	130.4	(5.13)	16.1	(61)	−3.3	(26)
Jan	133.2	(5.24)	15.0	(59)	−3.3	(26)
Feb	70.6	(2.78)	18.9	(66)	1.1	(34)
Mar	62.0	(2.44)	21.1	(70)	1.1	(34)
Apr	87.5	(3.44)	25.6	(75)	3.3	(38)
May	61.8	(2.43)	32.2	(90)	5.6	(42)
Total	971.5	(38.24)				

*Days with max. below 0°C. (32°F.) 0
Days with min. below 0°C. (32°F.) 17

Book Accessions — June 1977 to May 1978*

EDIBLE NUTS OF THE WORLD, by Edwin A. Menninger, D.Sc. Horticultural Books, Inc., 1977.

FLORA AND SILVA, Vol. III, edited by W. Robinson. Gift of the Seattle Garden Club.

FLORA JAPONICA, 3 volumes plus handbook (guide), by Dr. P.F. von Siebold. Reprinted by Kodansha Ltd., Tokyo, 1976. Gift of the Seattle Garden Club.

FLOWER AND FRUIT PRINTS OF THE 18th AND EARLY 19th CENTURIES, by Gordon Dunthorne. Gift of the Seattle Garden Club.

FORMAL GARDENS IN ENGLAND AND SCOTLAND, Vols. I and II, by H. Inigo Triggs. Gift of the Seattle Garden Club.

GARDENS OF COLONY AND STATE, 2 volumes, by Alice G.B. Lockwood. Gift of the Seattle Garden Club.

GARDENS OLD AND NEW, Vols. I and III, edited by H. Avery Tipping, M.A. Gift of the Seattle Garden Club.

INTERMOUNTAIN FLORA, Vol. 6, by A. Cronquist, et al. Hafner Publishing Co., 1977.

NORTHWEST TREES, by Stephen F. Arno and Ramona P. Hammerly. The Mountaineers, 1977.

THE PLANT INTRODUCTIONS OF REGINALD FARRER, edited by E.H.M. Cox. New Flora and Silva Ltd., 1930.

THE POWER OF PLANTS, by Brendan Lehane. McGraw-Hill, 1977.

RHODODENDRONS AND THE VARIOUS HYBRIDS, Second Series, by J.G. Millais. Gift of the Seattle Garden Club.

TREES AND SHRUBS HARDY IN THE BRITISH ISLES, 8th Edition Revised, Vol. III, by W.J. Bean. M. Bean and John Murray, Ltd., 1976.

*The complete list of book accessions is on file in the Arboretum office.

Arboretum Foundation Annual Reports

President's Report

The year just past has been full of good things, like the continuing work of our outstanding corps of volunteers from guides to directors, from Plant Sale workers to Unit Council greenhouse greenthumbs, from hospital visitors to weeders. There have also been some changes, especially in the retirement of Mrs. Marilynn Holm, a long-time and valued employee, and the resignation of Mrs. Jewell Hickey. These ladies have been replaced by the outstanding team of Mrs. Margaret Kearns and Mrs. Eden Wood.

An interesting feature in March was the co-sponsoring by the Arboretum Foundation and the Children's Orthopedic Hospital of a lecture and seminar by Mr. A.S. White of Oxford on "Horticulture as Therapy." The excellent staff work required for this event was performed by Mrs. Diggs Docter, Mrs. Vera Frazier, Mrs. Elizabeth Moses and Mrs. Marlee McKibbin.

The new membership dues schedule approved at the 1977 Annual Meeting took effect in October. As hoped for, there has been a decided increase in dues income as well as a raising in membership class by some members. The number of members has remained constant at about 3000, with new memberships equaling losses. We do need, however, a further rise in membership class to keep dues income on a par with administrative expenses. Members are reminded that such an increase entitles them to pick up a copy of the excellent book by Dr. Henry Schmitz, *The Long Road Travelled,* an account of forestry at the University of Washington.

The most exciting happening of the year was the excellent Update Plan for the Arboretum prepared by the firm of Jones & Jones. A series of workshops and presentations and wide invitation for citizen ideas and views preceded the drafting of the plan. The necessary procedures are being followed as the plan progresses through the Seattle City Council and the University Board of Regents. Foundation members have indicated overwhelming support for the plan, and there are hopes that it will be implemented this year in ways most conducive to Foundation support.

Assurances are being sought that the Japanese Garden will receive adequate maintenance and security, with or without an admission charge. Upon receipt of these assurances, fund raising for the rebuilding of the Tea House will be conducted, with construction commencing immediately thereafter.

All in all, it was a good year in the past and will be a great and promising one in the future.

LEROY P. COLLINS, JR.

Highlights of the Annual Meeting

The annual meeting of the Arboretum Foundation was called to order at Horatio's restaurant at 7:30 p.m. following the dinner.

The minutes of the 1977 annual meeting were accepted and after a few introductory comments, Foundation President Leroy Collins called on Capt. Arthur Gardiner to present the Treasurer's report. Captain Gardiner stated that although total assets show a shrinkage of $19,000, this is largely a paper drop resulting from the adoption of a new accounting system and from the final establishment of a retirement pension for Mrs. Marilynn Holm. The Price Waterhouse audit is reproduced on pp. 32 & 33.

An Arboretum report was given by Mr. Joseph Witt, Curator of Plant Collections. He particularly mentioned the recent gift of a new Massey-Ferguson tractor purchased with profits from the 1977 Plant Sale, and stated that Unit Council funds will also make it possible for him to attend the Endangered Plant Conference at Kew Gardens in September. His formal report for the year 1977-78 appears on p. 26.

Colonel Collins introduced the officers and

chairmen of standing committees for the year 1977-78. He discussed various subjects of particular interest to the Arboretum Foundation.

Mr. Howard W. Millan, a forester of 30 years with the Weyerhaeuser Company, prefaced his slide program with a few remarks about the plant explorer David Douglas. His program dealt with western conifer forests of various ages from virgin stands to second and third growth, showing the effects of nature's clear cutting by avalanche and forest fire and stressing the philosophy behind modern lumbering techniques.

John Putnam, Chairman of the Nominating Committee presented the slate of Officers and Active Directors, and these nominations were unanimously accepted. The new officers are listed in our revised masthead (Inside Front Cover), and the full list of directors appears on p. 31. ♦

Annual Report of the Unit Council

1978 was a very good year. This was a special year of public service. Our activities were directed toward helping and teaching the community about plants.

The Guide Program blossomed and expanded under the guidance of Elizabeth Moses:

A. Foster Island and Native Walk Guides conducted 81 tours for a total of 2276 people. The groups included school children from Seattle, Bellevue, Renton, Sultan, Kent and Snohomish, garden clubs, deaf-blind group, 250 Japanese students and a botany class.

B. Sixteen Japanese Garden Guides conducted 23 tours for 125 children and 470 adults.

C. "A Guide for Guides" of General Tours in the Arboretum was compiled. 229 people in 25 groups toured the Arboretum. There are 16 guides.

D. Explorers' walks of the Arboretum were held monthly and occasionally bi-monthly. 20 to 80 people participate in each session.

Community Services:

A. Hospital Volunteers spent 36 afternoons teaching 300 patients at Children's Orthopedic how to pot and care for plants. Our Nursing Home Volunteers go monthly to two nursing homes and teach 8 to 16 ladies each session. This has been such a rewarding experience that I have copies available of chairman Virginia Level's report so that you can read and understand more about this program.

C. School Program Volunteers have gone into 40 classrooms to teach 1150 children about our native plants. In order to do this intelligently, lectures for the volunteers were arranged. Russ Mohney spoke about "Edibles," Dr. Erna Gunther discussed "Plant Uses by Northwest Indians" and Dee Johnson talked about "Indian Mythology."

The Patricia Calvert Greenhouse is a busy, bustling place all 12 months of the year. Every Tuesday eight to ten ladies work there and three ladies work on Fridays. This service is educational. Unit Council members are taught how to propagate plants. Unusual plant material collected from the Arboretum is grown so that it will be available to the general public. 1524 plants from the Greenhouse were sold at the Plant Sale for a profit of $1682.

Joan Arnold organized a very beautiful Flower Show. Thirty Units participated. Any plant specimen was acceptable. This show was a first for the Unit Council and a first for Seattle. The Unit Council members and the general public learned a great deal about spring plant horticulture.

On a rainy day in April, 100 women braved the rainy weather to weed in the Arboretum (great fun!).

The Herbarium committee collected, pressed, mounted and labeled 63 specimens from the Arboretum for the National Arboretum and Washington Park Arboretum.

This year the Plant Sale was a rip-roaring success. 500 workers participated in 20 plant departments and 16 service departments. The department chairmen work three to four days weekly for nine months. Our grand profit was $25,000 but thousands of hours were spent by our members in order to achieve this, including reading extensively to learn about plant material and then going out to find it. As Plant Sale Chairman Barbara Andersen says, "One of the

greatest features of this sale is that the best and most unusual plant material is available and every plant is in one place."

This year 32 Bulb Programs were given. Jeanne Gardiner conducted a Summer Bulb Training Course and 20 people participated in the four sessions. She reports that the Bulb Bed is all planted for late summer and fall color. The profit on the Bulb Sale was $5,700. Dates for the next sale are October 4 and 5. Instructions on the care of bulbs will be given at the sale.

The Unit Council now has 1490 members, including two new units formed this year. I invite all Foundation members to join the Unit Council. We need your help (a few hours or many hours) if we are to continue and expand our public service committment to the community.

SALLY SUE COLEMAN
Unit Council General Chairman, 1977-1978

Active Directors of the Arboretum Foundation

1978-1981

Mrs. Jack Docter
John Fellows
Mrs. Arthur P. Gardiner
Mrs. Nancy Clarke Hewitt
Mrs. Gordon Logan
Mrs. Gordon Mulder
Col. T. (Ted) A. Rathje
John S. Robinson
Mrs. Harry Slater
Mrs. William Speidel
Lynden Watts
Mrs. W.E. Williams

1978-1980

Dr. Neil D. Adams
Mrs. Fred G. Clarke, Jr.
Harry Davidson
Richard Eberharter
Mrs. George Frazier
Mrs. John Ormsby
John A. Putnam
Kenneth Sorrells
Mrs. Raymond Taggart
Richard Vinal
Lawrence Waldron

1978-1979

Mrs. Robert K. Arnold
Bruce A. Briggs
Mrs. Joseph P. Butler
Miss Phyllis Cavender
Mrs. Allen B. Engle
William O. Griswold
Glen Hunt
Mrs. Allen D. Moses
Mrs. Edward A. Niemeier
Mrs. Henry Schmitz

Honorary Board of the Arboretum Foundation

Mrs. Hugh Baird
John F. Behnke
Robert J. Behnke
Mrs. Robert Berry
Dean James S. Bethel
John A. Blethen
Mrs. Prentice Bloedel
Prentice Bloedel
Mrs. James Brennen
Mrs. Edward E. Carlson
Mrs. C. Spencer Clark
C. Spencer Clark
Mrs. John A. Clark
Mrs. H.P. Clausing
Dr. Dale W. Cole
M.C. Collarino
James C. Coons
Mrs. M.L. Cropley
Donald C. Davis
Mrs. Elliott DeForest
Edward B. Dunn
Ford Q. Elvidge
Mrs. Donald G. Graham
Mrs. Ray Granston
Mrs. Conner E. Gray
J.A. Green
Joshua Green, III
Mrs. Everett Griggs, II
Mrs. Percy Guy
Dr. William H. Hatheway
John Hauberg
Jackson K. Holloway, M.D.
Mrs. Charles H. Hyde
Mrs. Henry C. Isaacson
Dr. Arthur Kruckeberg
Dean Gordon D. Marckworth
Joseph Marshall
Donald K. McClure
Mrs. Horace W. McCurdy
Mrs. Moritz Milburn
Mrs. G.O. Moen
Mrs. Brian O. Mulligan
Brian O. Mulligan
Mrs. Frantz Nehammer
Mrs. Rex Palmer
Mrs. Leon A. Phillips
Giacomo Pirzio-Biroli, M.D.
Mrs. F. Arnold Polson
Mrs. Hazel Pringle
Mrs. Robert Read
Fred M. Robbins
Mrs. John S. Robinson
Edward L. Rosling
Mrs. Maxwell J. Short
C. Edward Simons, Jr., M.D.
Mrs. Roger Spurr
Mrs. Lester O. Trabert
Mrs. Kerry Trimble
Mrs. Corydon Wagner
Mrs. George Weyerhaeuser
Capt. W.R. Wilson
Mrs. Joseph A. Witt
Joseph A. Witt
Mrs. Walter Wyckhoff
Lake Washington Garden Clubs:
Mrs. Newton Morris
Seattle Garden Club:
Mrs. Lyman Black
Tacoma Garden Club:
Mrs. Dan Hewitt
Washington State Federation of Garden Clubs:
Mrs. John McHutchison

Note: Because the Arboretum Foundation's Executive Committee and the Unit Council's Governing Board were not yet filled at press time, we shall publish the complete lists in the winter issue.

THE ARBORETUM FOUNDATION

STATEMENT OF CASH RECEIPTS, DISBURSEMENTS
AND CHANGES IN CASH BALANCES

	Year ended April 30, 1978					Year ended April 30, 1977
	Unrestricted	Restricted	Building Fund	Endowment Trust Fund (Note 4)	Total all funds	Total all funds
Receipts:						
Dues	$ 30,524				$ 30,524	$ 23,285
Donations	5,707				5,707	3,330
Unit Council-						
Plant and bulb sales	51,609				51,609	48,537
Other	2,853				2,853	2,925
Interest on savings and investments	19,043	$ 209	$ 7,160		26,412	33,573
Income from investment trust				$1,068	1,068	1,007
Sale of investment in Prudential Insurance Company investment plan	13,038				13,038	
Advertising and miscellaneous	6,787	500		219	7,506	4,610
	129,561	709	7,160	1,287	138,717	117,267
Disbursements:						
Salaries and wages	16,101				16,101	16,774
Payroll taxes	1,539				1,539	1,557
Bulletin and publications	25,280				25,280	22,805
Publicity	3,446				3,446	2,771
Purchase of annuity contract (Note 3)	10,078				10,078	
Printing expenses	11,531				11,531	
Retirement gift	2,100				2,100	
Other operating expenses	16,110			400	16,510	11,276
Purchase of investments				453	453	
Unit Council expenses-						
Plant and bulb sale costs and expense	29,003				29,003	24,382
Utilities, supplies and postage	7,013				7,013	6,450
Donations to University of Washington Arboretum	18,712				18,712	20,127
Donations to Japanese Garden						25,000
Donations to Memorial Gates						3,165
Donations to frost hardiness study	8,654				8,654	5,000
Net advances to University of Washington Press (Note 2)						12,000
	149,567			853	150,420	151,307
Excess (deficit) of receipts over disbursements	(20,006)	709	7,160	434	(11,703)	(34,040)
Transfer of Endowment Fund income	524			(524)		
Cash balance, beginning of year	422,223	4,186	145,134	100	571,643	605,683
Cash balance (including short-term investments), end of year (Note 1)	$402,741	$4,895	$152,294	$ 10	$559,940	$571,643

See accompanying notes to statement of cash receipts, disbursements and changes in cash balances

The notes reproduced below pertain to the audit by Price Waterhouse on the opposite page.

THE ARBORETUM FOUNDATION

NOTES TO STATEMENT OF CASH RECEIPTS, DISBURSEMENTS
AND CHANGES IN CASH BALANCES

YEARS ENDED APRIL 30, 1978 AND 1977

The Arboretum Foundation was formed on June 11, 1935 to help promote and assist the development and maintenance of the University of Washington Arboretum, Botanical Garden and Herbarium.

NOTE 1- CASH BALANCES:

The cash balances, including short-term investments, at April 30, 1978 were as follows:

Deposited with	Balances at April 30, 1978
Commercial accounts:	
Peoples National Bank	$ 9,644
Rainier National Bank	3,813
Savings accounts:	
Washington Mutual Savings Bank	13,135
Prudential Mutual Savings Bank	34,700
Bank notes, Rainier National Bank	200,000
U.S. Treasury bills, at cost which approximates market	298,613
Seattle-First National Bank trust account	10
Cash on hand	25
	$559,940

NOTE 2- ADVANCES:

The Arboretum Foundation advances funds to the University of Washington Press to assist in financing the publication of books which are beneficial to the Foundation's interests. During the year ended April 30, 1977, the University of Washington Press repaid a $10,000 advance made in 1973 and the Foundation advanced an additional $22,000 which is to be repaid by July 1978.

NOTE 3- RETIREMENT FUND:

During the year ended April 30, 1978, the Foundation invested $10,078 in an annuity contract to provide retirement benefits for Mrs. Marilyn Holm, the former Executive Secretary. The annuity contract is for ten years certain beginning in 1987 with The Arboretum Foundation named as beneficiary of the balance if Mrs. Holm is not then living. The market value of the contract at April 30, 1978 was $10,225.

NOTE 4- ENDOWMENT TRUST FUND:

On March 10, 1944, a trust agreement was established between Seattle-First National Bank, as trustee, and The Arboretum Foundation for funds bequested to the Foundation. Pursuant to the trust agreement, the principal of the Endowment Trust Fund may not be disbursed prior to March 10, 1994 and at that time is to be disbursed to the University of Washington for use in its arboretum. The trust agreement may be extended by mutual consent of the parties. The principal is invested with Seattle-First National Bank in common stock and bond funds. At April 30, 1978, the balances in the principal account at cost were $16,285 with a market value of $16,626.

Announcements from the Unit Council

Unit Council meetings are scheduled for September 21, November 16, 1978 and March 15 and May 17, 1979, at St. Stephen's Episcopal Church in Laurelhurst from 9:30 a.m. to 12 noon. Margaret Mulligan, Horticulture Chairman, will present a stimulating display of plant material.

Unit Council will again be offering a Botany course. There will be a series of 10 two-hour daytime classes in the fall and another series of 10 classes in the spring of 1979. Instructors will be A.B. and Virginia Adams. Mr. Adams is working on his doctorate in Plant Ecology at the University of Washington. Mrs. Adams is also working on her PhD on Pollination Biology. Classes will be held at the University so that microscopes will be available for students. The price will be $25 per series and classes will be limited to 24 students. Dates of the classes will be announced later. Those interested in this course should call Margaret Kearns, at the Arboretum Foundation Office, 325-4510, leaving name and address so pertinent information can be mailed as soon as dates and times are established.

Also, Connie Raphael is offering two series of beginners' classes in Bonsai Techniques. There will be ten classes in each series, four in the fall and six in the spring, one series being on Mondays and the other on Tuesdays, from 10:30 to 12:30 p.m. The dates for the Monday series are October 2, 9, 16 and 23, 1978 and Feb. 5, 12, 19 and 26 and March 5 and 12. The Tuesday series will be held on October 3, 10, 17 and 24, 1978 and Feb. 6, 13, 20 and 27 and March 6 and 13, 1979. The price will be $60, which includes two trees and potting soil. To register, call Mrs. Raphael, 282-7630.

The Thorgrimson Cup was awarded to Unit 66, and the Year Book Award went to Unit 41.

The Patricia Calvert Greenhouse is badly in need of volunteers who can give at least one Tuesday a month to assist in the work of taking cuttings and propagating. Willing workers are invited to meet at the greenhouse at 9 a.m. any Tuesday.

The Explorers' Walk held each month on the 4th Wednesday from 10:00 a.m. to noon (except December) continues to attract many participants. Meeting in the Arboretum Office parking lot, the group is lead on a guided tour of those parts of the Arboretum which are most interesting that particular month. Everyone is welcome to learn about the Arboretum in this most personal way. All that is required is to show up, dressed appropriately for the weather, on any fourth Wednesday any month.

PATRICIA MONCINI

Horticulture Classes in Greater Seattle

*PEGGY FARRELL**

The delights of gardening are well known to all of us; but unfortunately there are times of frustration as well. Have you ever wished you could take the guesswork out of your gardening? Or maybe you have moved to the northwest from a different climate, and have a whole new world of plants to explore. Perhaps you may want to turn your hobby into a vocation. For whatever reason, you may be ready to immerse yourself in horticulture classes.

You will find quite a variety of classes available in the Seattle area. *Bulletin* readers are of course familiar with the University of Washington classes described in *Spectrum*. In addition to these, there are programs offered by community colleges — Bellevue, Edmonds, and South Seattle — which lead to an associate degree in horticulture after two years.

Even if you are not aiming for a degree, it is possible just to take courses at these schools. Most courses are given for credit, and a few will have prerequisites. But this need not scare anyone off. These programs contain many excellent courses, which any knowledgeable gardener would enjoy.

Occasionally some of the community colleges offer a course or two under Continuing Education — usually in the spring. These may not always be of the same caliber as the regular departmental classes. But it may be worthwhile to check on the offerings each quarter.

At *Bellevue Community College,* the Environmental Horticulture program offers a choice of three areas of specialization: Landscape/Environmental Management, Landscape Design and Turf Management. In the field of landscape design, a good art background is desirable. Art courses in basic drawing and design are prerequisites for the landscaping classes. In the horticulture classes, the scientific aspects of the field are emphasized, and some science background is helpful.

Bellevue offers excellent botany classes — General Botany, The Plant Kingdom and Taxonomy of Flowering Plants. In Plant Identification courses, you learn the growth habits, culture and landscape uses of plant materials throughout the seasons — fall, winter and spring. There are also courses in ornamental pruning, soils, plant propagation, dendrology (the identification and classification of trees) and many others. Any of these would be worthwhile for the avid gardener.

Most classes are scheduled in the daytime and usually require students to be on campus a minimum of three days a week. However it is often possible for a part-time student to arrange a schedule leaving the afternoons free. A few of the horticulture classes meet in the evening, but not many.

Facilities on the Bellevue campus include modern classrooms and laboratories and two handsome greenhouses.

At *Edmonds Community College,* Ornamental Horticulture is a flexible and practical program designed for students who want to work while attending school. Most daytime classes are scheduled for long (three- or four-hour) sessions twice a week, leaving the other days free. There is also a good selection of evening classes.

This two-year program offers a choice of specializing in Landscape Maintenance, Landscape Construction and Design, Retail and Wholesale Nursery or in Pesticide Application.

The curriculum offers a good balance between the academic and the practical. Basic science is offered in two courses designed specifically for the horticulture student — Horticultural Biology, and Soils and Plant Nutrition. There are excellent courses in Plant Identification—fall, winter and spring. You can take courses in pruning, plant propagation, insects, plant diseases and landscape design. There is a series of courses on plants which seems made-to-order for the amateur horticulturist. It covers such subjects as house plants, ferns, herbs, rhododendrons and azaleas, native plants in the landscape, container

*Peggy Farrell, a member of Unit 41 and a Mercer Island resident, is well qualified to write about horticultural courses. She has recently investigated the class offerings in the Seattle area, before deciding to take a two-year course in landscape design at Bellevue Community College, which will lead to an associate degree in that subject.

gardening, Japanese garden art, aquatic plants — just to name a few.

Facilities on the new campus include modern classrooms and two large greenhouses. The college is located just north of the Snohomish county line not far from I-5.

South Seattle Community College offers a career-oriented program in Landscape and Environmental Horticulture. The curriculum aims for a balance between academic information and practical training. In the second year of the program the student may specialize in Environmental Horticulture, in Landscape Design and Construction, or in Floristry. (This is the only community college to have a floristry school.)

The daytime program is usually filled by full-time students. But there is a good selection of evening classes for the part-timer. Most basic courses are offered both day and night, and include such subjects as Plant Identification (fall, winter and spring), Horticulture Science, Landscape Design, Drafting for Horticulture, and Floristry.

On-campus facilities include a large greenhouse, potting house, lathhouse, special turf-growing plots and a working florist's shop. Students here receive practical experience normally only obtained in the field, and are well prepared to enter the job market with a working knowledge of the industry.

In a brief comparison of the three programs, you will find that much of the same basic material is covered by all three, but that the approach and emphasis differs. Your choice will depend on what you want. You may also find that convenience of location and schedule times may determine your choice.

We are fortunate in Seattle to have such a wealth of material from which to choose. Horticulture is an exciting, dynamic field — always offering something new to learn. Broaden your horticultural horizons. Sign up for a class this fall. ♦

Book Reviews

WILD SHRUBS, by Joy Spurr. Pacific Search Press, Seattle, 1978. Color photographs and black and white sketches. 95 pages. Price: $7.95.

This beautifully illustrated book on northwest shrubs will be especially welcomed by Arboretum gardeners and study groups. Each of the forty wild shrubs included is illustrated by the fine color photographs we have learned to expect from author-photographer Joy Spurr, and by excellent drawings from Sally Dickman.

It is eminently suitable for field use, having a colorful weatherproof plastic cover, a horizontal format measuring eight by eleven inches, with space for notes on each page. There is a table of metric and English measurements, even a ruler at the edge of a page for measuring plants in the field.

The list of shrubs was subject to space limitations, but includes most of the best-known and choice shrubs native to this area. Suitability for different types of gardens and locations therein, ease of propagation and attractiveness to birds were among the factors influencing the choices.

Requirements of shrubs from different locations are given in part of the charming introduction.

"Soil, moisture, drainage, light, and exposure conditions in your garden must also be studied before you make your final plant selection. By observing wild shrubs in their natural growing conditions, you can learn a lot about their needs. For example, evergreen huckleberry *(Vaccinium ovatum)* and mountain box *(Pachistima myrsinites)* usually grow in filtered shade beneath conifer trees. Sweet gale *(Myrica gale),* Labrador tea *(Ledum groenlandicum),* and bog laurel *(Kalmia polifolia)* grow in thickets and, as they are always in need of a continuous supply of water at their feet, grow in swamps or beside streams and lakes. At the same time, they need open sky above them so they can receive full benefit of the sun's rays throughout the day.

"The low growing kinnikinnick *(Arctostaphylos uva-ursi)* and sticky laurel *(Ceanothus velutinus)* like good drainage. Both plants have a shrubby habit and thick leaves, adaptations that conserve moisture for the shrubs over a long period of time. This allows them to survive in hot, exposed areas where there is little rainfall and the soil is dry much of the summer.

"Exposure to endless days of fog and salt spray in the coastal regions is not agreeable to most inland desert plants, but shrubs such as red currant *(Ribes sanguineum)* and ocean spray *(Holodiscus discolor)* thrive in many different kinds of habitats and seem to be equally happy in either moderate elevations inland or in seaside locales. The Oregon grapes *(Berberis aquifolium* and *B. nervosa)* are utilized for roadside plantings and in landscape plans for industrial buildings because they can withstand polluted air and automobile fumes."

Propagation by cuttings is especially well described and illustrated according to methods long used in the Arboretum classes and greenhouse. (The author collaborated with others in producing the enlarged and revised edition of the much-used Arboretum Foundation booklet *Cuttings Through the Year,* 1966.) Propagation by seeds, layers and division of suckers, stolons and runners is also discussed.

A cold frame is recommended for shade and protection of the potted young plants, and directions are given, with a sketch, on how to build one.

It is a thoughtful well-planned little book. Each page contains: botanical and common names of the plant and its family; a sketch showing habit, an individual branch and botanical details of the flower; and narrative descrip-

tion including field characteristics, derivation of names, adaptability to garden conditions and, often, interesting folk and garden lore. A diagram of plant parts, a glossary of botanical terms and meanings of botanical names are included. A helpful list of authors' names explains the use of abbreviations following the genus and species names, for example, L. (for Linnaeus) or T & G (for Torrey and Gray).

Further helps are given in chapters on landscaping, lists of nurseries and public collections, and the bibliography.

In a personal communication the author stated that, if she had her garden to do over again, she would use only wild shrubs.

MAY GUY

THE WILDERNESS WORLD OF JOHN MUIR, edited by Edwin Way Teal. Houghton Mifflin Company, Boston, 1954. (Reprinted in paperback.) Price $5.95.

John Muir was a man of transcendent ability. He left his indelible mark upon the wilderness he traversed, the mountains he climbed. Such a man of character and determination left in his writings the peculiar essence of his spirit.

Edwin Way Teal, editor of *Wilderness World,* in his introduction and in his interpretative comments, has preserved the best of Muir's writings based on the journals Muir kept. Our generation is given a unique picture of the American wilderness as it was one hundred years ago. Although this work was compiled some twenty odd years ago, it has been recently reprinted as public awareness of the need to preserve our environment has increased. *Wilderness World* seems to have struck a responsive chord!

In his introduction Mr. Teal, himself a naturalist of note, states: "In talking to those who knew John Muir I found considerable disagreement as to what phase of natural history held first importance in his mind. One thought it was trees, another believed it was geology, a third suggested it was plants, a fourth thought it was the whole interrelationship of life, the complete rounded pattern of the mountain world. Today Muir would be called an ecologist."

What kind of a man was the great and intrepid John Muir? For one thing he was stoically indifferent to hardships, seeming to be inured to them. During the time he was making solitary expeditions into the mountains of California, he subsisted largely on tea and bread. He lived a life of pristine simplicity, never carried a gun and traveled generally on foot. With a well-developed curiosity Muir always found more than he expected in nature. His writings abound with praise of mountains, lakes and streams and the harmonious rhythm in all natural beauty. He even loved the wild stormy elements; when a winter gale struck the forest along the tributaries of the Yuba River in California, Muir climbed to the top of a Douglas fir better to enjoy the adventure of the storm. Whether climbing trees or ascending mountain slopes he was equally at home.

In his epic work, *Mountains of California,* he wrote, "I am hopelessly and forever a mountaineer." Then continuing he said, "Standing here in the deep, brooding silence all the wilderness becomes motionless, as if the work of creation were done. Here are the roots of all life of the valleys and here more simply than elsewhere is the eternal flux of nature manifested." This passage was written after his ascent of Mt. Ritter in the high Sierras. So far as is known no one else had climbed this great peak. He called it "King of the Mountains."

Henry Fairfield Osborn, also a naturalist of note, wrote about him in these words, "Muir wrote about trees as no one else in the history of trees has ever written simply because he loved them." His experiences in the great area now known as Yosemite National Park evoked these words: "Yosemite Park is a place of rest, a refuge from the roar and dust and weary nervous wasting work of the lowlands. Nowhere will you find more company of a soothing peace-be-still kind. This one noble park is big enough and rich enough for a whole life of study and aesthetic enjoyment. No one can escape its charm. Its natural beauty cleanses and warms like a fir, and you will be willing to stay in one place forever like a tree." It is word pictures such as these that compelled the New York Times' reviewer to write, "No one can read the Muir anthology without becoming conscious of a quickening revelation of new aspects of the world's old beauty."

It is not to be wondered that in commemoration of his vast accomplishments many areas were named for him — Muir Woods National Monument in Marin County, California, Muir Glacier in Alaska and Muir Grove in the Sequoia National Park. *Wilderness World* is dedicated to the Sierra Club, the Wilderness Society, the National Park Association and to all who are fighting to preserve what John Muir sought to save. In his writings, which are now valued highly, are mirrored reflections of this great man and his devotion to saving at least a part of the wilderness he had explored.

ROSAMOND P. ENGLE

READING THE LANDSCAPE OF AMERICA, by May Theilgaard Watts. Collier Books, N.Y. Revised Edition 1975, paper back. Price $6.95.

In an exploration of changes, both natural and man-made, that take place in the land about us, this book invites inquiry into the background of whatever place in which one may be. The chapter headings give a small clue to the richness of material provided: "In Search of Antiques or *The Forests of the Great Smoky Mountains,*" "In Pursuit of Tolerance or *Wind, Shade and Salt in Massachusetts,*" "Looking Down on Improved Property or *An Airplane View of Man and Land.*" Mrs. Watts writes: "The land offers us good reading, outdoors — records, prophesies, mysteries are inscribed there, and changes — always changes. Even as we read from some selected page, whether mountaintop, forest, furrow, schoolyard, dune, bog, we see changes: in stirrings and silences, flavors and textures, spacing, tolerances, and confrontations and tensions at the edges."

Through explorations of different areas of our country, searches of records and personal observation, Mrs. Watts guides us into methods that we may also follow. Her style is narrative. She takes us on trips with her family and we go together down abandoned roads, through fields and into the canyons and deserts, noting the effects of past events, forecasting what may come. We are encouraged to read this book, then "close it, and go outdoors to read from the original." We are helped along the way with drawings, and extensive bibliography at the end of each chapter and an index that includes names of places, people and plants (both common and botanical names). For anyone contemplating a trip anywhere in the United States, this is surely recommended reading material. My only regret is that the author did not quite make it into Puget Sound country.

RUTH VOROBIK

Notes and Comments

The Arboretum's secretary for the past two and a half years, Sally E. Dickman accepted an administrative position with the College of Medicine and left the Arboretum in mid-July. Sally will be badly missed by the staff for her efficiency and cheerful attitude as well as her talented drawings.

Her replacement is Phyllis de Friese, whose background includes experience in administrative work for the University and work in a commercial nursery. *J.A.W.*

We wish to thank Ruth Mary Close for her faithful reporting of Unit Council News and for her creative membership on the Editorial Board. Patricia Moncini, Secretary of the Unit Council, has assumed these responsibilities.

It was with a mixture of sadness and anticipation that we accepted Nancy Walz's resignation this spring — sadness to lose her creative support, her calm, efficient, responsible attitude toward her work, and her good company; anticipation because we know that Nancy will achieve whatever goals she sets for herself, in fact will reach beyond normal expectations. We have benefited from her interest in photography and we wish her well in this, her chosen field.

In the meantime we welcome Mary Ann Schnaidt who has come to take her place. We (I, that is!) thank our (my) husband, Giacomo Pirzio-Biroli, for giving many hours not only to supply us with his own photographs but also to print the films of our authors. *J.P-B.*

New Members of the Arboretum Foundation

We are pleased to welcome the following new members (April 1, 1978 through June 30, 1978):

Sponsor—Robert J. Grant. *Contributing*—Schuyler Bissell. *Sustaining*—Carol Betts, D.A. Graham. *Annual* — Durwood Alkire, Mrs. Fern Anderson, Lucius Andrew, Larry H. Arndt, Janice Barnes, John Barnes, Linda Barr, Kendall Beard, Curtis Blundell, Marie Churney, David Clements, Eugene Crumb, James Cutler, Mr. and Mrs. Arthur Davis, Donald Deighton, Nancy L. Dice, William Dukes, R.A. Earnest, Mrs. Joyce Evans, Delbert Freeman, W.F. Handley, Douglas Haughton, Gerald Herndon, Charlotte Hill, Cynthia Hogg, Thomas Hungerford, Janice Keene, Harold Kingner, Mrs. Nanette Koon, Anne Laird, E.D. Layman, Howard Lincoln, Linera Lucas, Mrs. Paula Markley, Bernita McKinion, Deborah Middleton, Mrs. Miriam Moser, Newport Hills Garden Club, Howard Oakland, Victor C. Oblas, Walter Piper, John Richards, Archie J. Richardson, Florence Roberts, Allan Rogers, Mr. and Mrs. Francis Rothschild, John Sangster, Mrs. Anne Sather, Liv-Randi E. Scham, Mrs. Rosalie Scheve, Mrs. Jennifer Spiers, David P. Thomas, Mrs. Stephan P. Thomas, Gerard Vaness, Dean Weaver, Lynn Uppenhouse Wilson, Ann Wood, Mr. and Mrs. Wayne Woodmansee.

We are also grateful to the following who have increased their dues to:

Life — Dr. Harold G. King, Mr. and Mrs. Roger W. Spurr. *Sponsor* — Mrs. R.J. Richardson. *Supporting* — Mrs. Virginia Bloedel. *Contributing* — Mrs. Daniel H. Coleman, L.H. Pinkers, John Reynolds, Dorothy Smalling, Lidie H. Sprague, J.A. Walsh. *Sustaining* — E.W. Andrews, Leroy P. Collins, Jr., Forest Faulkner, Dale Huggins, Mrs. James T. Johnson, Mrs. Guy Martin, Mrs. Max Meerkerk, John M. Peterson, University Book Store.

University of Washington Classes

Spectrum, the quarterly journal for Continuing Education, is sent free to those who have indicated interest in the University of Washington's night courses, adult education classes, concerts and other cultural activities. Those who wish to obtain early notice of such classes and registration forms are urged to place their names on the mailing list by calling 543-2590.

Continuing Education

IDENTIFYING MUSHROOMS OF THE PACIFIC NORTHWEST. Instructor: Prof. Daniel Stuntz, Botany Department. Mostly Monday nights, Sept. 25-Nov. 27; 7:30-10:00. 10 sessions, $40.

SCIENTIFIC DRAWING. A drawing workshop for everyone interested in learning to illustrate with scientific precision, clarity and esthetic appeal, whether for personal or professional use. Of special interest to botanists, birders, zoologists, hikers, naturalists, anthropologists, scientists. Instructor: Jean Logan, scientific illustrator. Monday nights, Oct. 2-Dec. 4; 7-10. 10 sessions, $40.

A WEEKEND AT PACK FOREST. Discover the special environment of Mt. Rainier, an alpine island shaped by volcanic action, glaciers and landslides. Lectures on Friday and Sunday, full-day Saturday field trip. All meals and comfortable dormitory rooms provided. Warm all-weather clothing, hiking boots. Instructors: Fiorenzo Ugolini, Professor, Forest Resources; Ola Edwards, Forest Resources. Friday, Oct. 6, 8 p.m. thru Sunday, Oct. 8. Fee $67.

IDENTIFYING ROCKS AND MINERALS. Origin, classification and methods of identifying the most common types of rocks and minerals seen at the earth's surface. Instructor: Brady Rhodes, Geology. Wednesdays, Oct. 4-Dec. 6; 7-9. 10 sessions plus one Saturday field trip, $30.

To register, call the Office of Continuing Education, 543-2590.

Arboretum Courses

BASIC GARDEN MAINTENANCE. Basic gardening techniques including soil preparation, planting, fertilizing, mulching and seasonal care of plants. Instructor: Chico Narro. Class limited to 15; Arboretum greenhouse. Saturdays, Sept. 30 thru Nov. 4; 1-3. 6 sessions, $15.

FALL TOURS. Tours of the Arboretum grounds in fall color. Instructor: Joseph Witt. Class limited to 20; meet at Arboretum office. Saturdays, Oct. 21, 28; Nov. 4; 10-12. 3 sessions, $5.

IDENTIFICATION OF NATIVE TREES AND SHRUBS. Field class covering 40 species of common trees, shrubs and ferns native to western Washington. Instructor: Carla Culver. Class limited to 15; meet at Arboretum office. Saturdays, Sept. 30 thru Oct. 21; 10-12. 4 sessions, $10.

PRUNING ORNAMENTALS. Techniques of pruning trees and shrubs. This is an outdoor demonstration class; appropriate clothing and waterproof footwear are recommended. Instructor: Chico Narro. Class limited to 30; meet at Arboretum greenhouse. Saturdays, Nov. 4 & 18; 10-12. 2 sessions, $5.

HOUSEPLANTS. Identification, techniques of propagation and care of indoor plants. Material and plants furnished. Instructor: Richard van Klaveren. Class limited to 15; Arboretum greenhouse. Saturdays, Oct. 14 thru 28; 9:30-12. 3 sessions, $15.

For further information, call 543-2730. To register, make check payable to the University of Washington and send to: Arboretum Courses, Anderson Hall (AR-10), University of Washington, Seattle, WA 98195.

CALENDAR OF EVENTS

Arboretum Foundation:		Regularly Scheduled:	
Board of Directors	September 14	Greenhouse Day	Every Tuesday
	December 7	The Mae Granston	
Executive Committee	October 12	Rhododendron Study Group	1st Monday
	November 9	Herbarium Committee	1st Friday
		Northwest Natives	
Unit Council:		Study Group	3rd Monday
Unit Council Meetings	September 21	Rock Garden	
	November 16	Study Group	3rd Wednesday
Governing Board	September 7	Arboretum Explorers	4th Wednesday
	October 5		(except December)
	November 2		

Northwest Ornamental Horticulture Society Plant Sale
Bellevue Square Pavilion, September 28 & 29, 10 a.m.-7 p.m.

Last Chance to Buy *Arboretum Bulletin* Back Issues: September 30.

8th Annual Arboretum Fall Bulb Sale: October 4 & 5.
Arboretum Office Parking Lot (see page 25).

Unit Council Flower Show: March 29 & 30. Work and Fun Day: April 12.
Arboretum Foundation Plant Sale: May 2 & 3.

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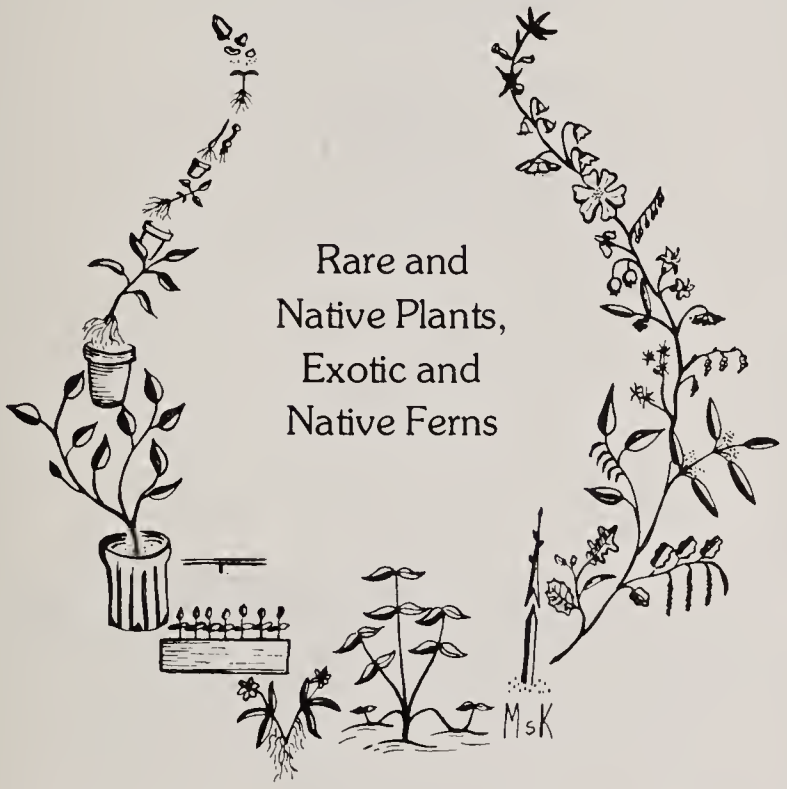

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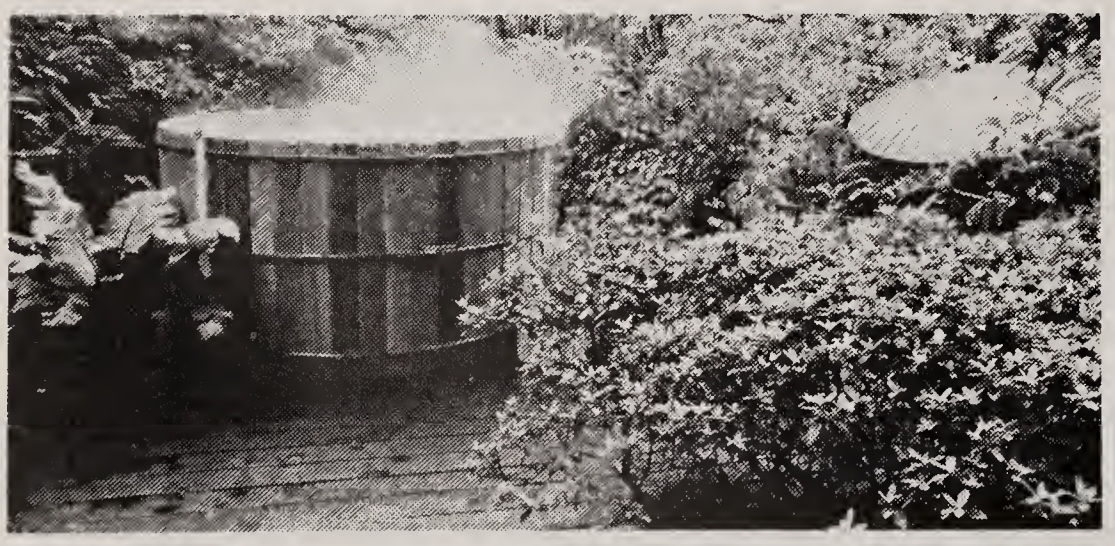

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Snowdrop *(Galanthus nivalis)*. **Photo: Jane Rogers.**

VISIT THE ARBORETUM IN THE AUTUMN

The crocuses and snowdrops may not yet be flowering but you can buy bulbs that will bloom next Spring!

8TH ANNUAL FALL BULB SALE: OCTOBER 4 & 5
See page 25 for details.

Find fall color in the oxydendrums, the *Cornus nuttallii*,
the *Sorbus* collection.
In late fall the hollies will be in full fruit.

Join the Explorers' Walk, meeting every fourth Wednesday each month, except December, in the parking lot of the administration buildings at 10 a.m. September 27, October 25 and November 22.